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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Patterson Brixus Creek Watershed Project, Site I Broome County Patterson Creek		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of the Site 1 Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.		

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The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian and vehicular traffic on the embankment and the auxiliary spillway, backfill all depressions and reseed these areas.
2. Repair the erosion and reseed the areas adjacent to the impact basin, along the toe of the embankment, and between the right abutment and the auxiliary spillway outlet. Also remove the stockpiles in the channel and near the outlet of the auxiliary spillways and reseed.
3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin and the left animal guard.
4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris on the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.
5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT - SITE 1
I.D. No. NY 698
DEC #86B-3457
SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Patterson Brixius Grey Creek Watershed Project,
Site 1 I.D. No. NY 698

State Located: New York

County Located: Broome

Stream: Patterson Creek (tributary of the
Susquehanna River)

Date of Inspection: July 23, 1980

ASSESSMENT

from 1 → The examination of documents and visual inspection of the Site 1 Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

→ The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian and vehicular traffic on the embankment and the auxiliary spillway, backfill all depressions and reseed these areas.
2. Repair the erosion and reseed the areas adjacent to the impact basin, along the toe of the embankment, and between the right abutment and the auxiliary spillway outlet. Also remove the stockpiles in the channel and near the outlet of the auxiliary spillways and reseed.
3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin and the left animal guard.
4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris on the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.
5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

George Koch

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
NY License No. 45937

Approved By:

W. M. Smith Jr.
Col. W. M. Smith Jr.
New York District Engineer

Date:

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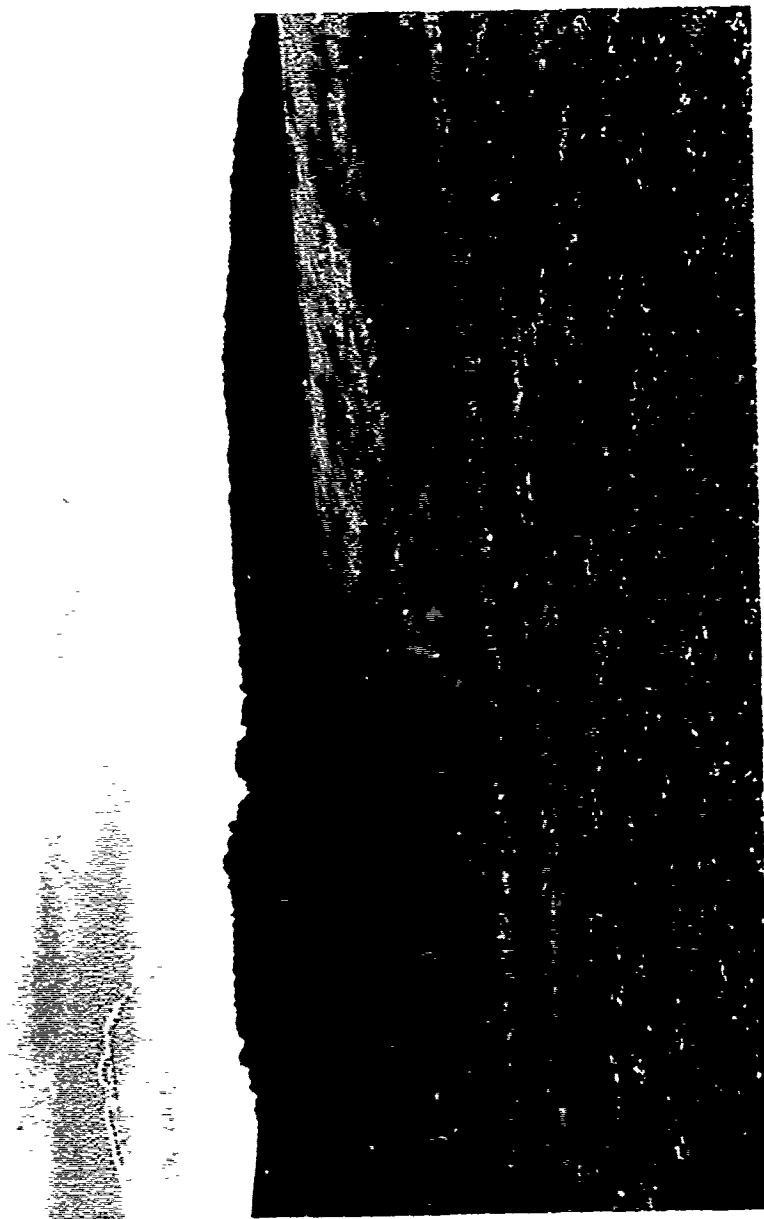


Photo #1
Overview of Patterson Brixius Site 1 Dam

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⑥ PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

PATTERSON, BRIXIUS, GREY CREEK

WATERSHED PROJECT, SITE 1

I.D. No. NY 698

DEC 1968 3457

SUSQUEHANNA RIVER BASIN,

BROOME COUNTY, NEW YORK

Report,

(Invest for Number NY698)

Phase I Inspection

SECTION 1: PROJECT INFORMATION

(10) George Koch

1.1 GENERAL

a. Authority

The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

→ The Site 1 Dam consists of a 1300 feet long homogeneous earth embankment with an auxiliary spillway located at the right end of the embankment in a cut section beyond the abutment of the embankment. The maximum height of the dam is 65 feet. The embankment has a crest width of 20 feet, an upstream slope of 1 vertical on 3 horizontal, and a downstream slope of 1 on 2.5. Two berms, located near the principal spillway riser on the upstream slope, were incorporated into the design.

→ The auxiliary spillway is a vegetated earth channel, with a bottom width of 340 feet and side slopes of 1 on 3 (left slope) and 1 on 2 (right slope).

→ The principal spillway is a rectangular concrete riser which extends above the upstream slope near the toe of slope. The riser is topped by a triangular trash rack, the sides of which form a drop inlet, which is utilized during high reservoir levels. Under low flow conditions, a rectangular low stage inlet, in the upstream face of the riser, controls the reservoir level.

→ A 30 inch diameter reinforced concrete pipe controls the flow between the riser and the impact basin located at the toe of the dam. An 18 inch diameter pipe, with a manually operated slide gate, the controls of which are located atop the riser, serve as the reservoir drain system. → 100, 10

b. Location

The dam is located on Patterson Creek, a tributary of the Susquehanna River, approximately 1 mile north of Endwell, New York.

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c. Size Classification

The dam is 65 feet high and is classified as "intermediate" in size (40 to 100 feet in height).

d. Hazard Classification

The dam is classified as high hazard because of its location above Endwell, New York.

e. Ownership

The dam is owned and operated by the County of Broome, New York.

f. Purpose

The dam is a floodwater retarding structure.

g. Design and Construction History

The dam was designed and construction supervised by the U.S.D.A. Soil Conservation Service (SCS). The dam was completed in 1968. The SCS office for Broome County, located at the Broome County Airport, has all design and construction information.

h. Normal Operating Procedures

Normal flows are discharged through the principal spillway. This structure has sufficient capacity to store and discharge a 100 year flood without use of the auxiliary spillway. Flow in excess of the 100 year storm will be discharged through the auxiliary spillway.

1.3 PERTINENT DATA

a. <u>Drainage Area</u> (sq. mi.)	4.42
b. <u>Discharge at Dam</u> (cfs)	
Principal spillway at Maximum high water	160
Principal spillway at auxiliary spillway crest elevation	132
Reservoir drain at Normal water elevation	45
Maximum known flood	
Total discharge at Maximum high water	17,500
c. <u>Elevations</u> (USGS Datum)	
Top of dam	1041.3
Auxiliary spillway crest	1034.0
Principal spillway crest	1016.0
Low stage inlet	998.0
Reservoir drain	981.9
d. <u>Reservoir</u> (acres)	
Surface area at top of dam	67.2
Surface area at crest of auxiliary spillway	51.2
Surface area at crest of principle spillway	24.1
e. <u>Storage Capacity</u> (acre feet)	
Top of dam	1280.
Auxiliary spillway crest	905.
Principal spillway crest	285.

f. Dam

Type: Homogeneous earth fill, with keyed cutoff and drain parallel to axis of dam.

Length (ft.)	1250.
Slopes: upstream	3H to 1V
downstream	2.5H to 1V
Crest Width (ft.)	20.

g. Principle Spillway

Type: Two stage reinforced concrete drop inlet structure. Low level orifice at elevation 998 and 15.0 weir at elevation 1016.0.

Weir length:	15.
Height	35.

h. Auxiliary Spillway

Type: Grass lined channel having trapezoidal cross section.

Bottom Width	340.
Length Control Section	50.

i. Reservoir Drain

Type: 18 inch diameter cast iron pipe with reinforced concrete inlet.

Control: Manually operated valve located in the spillway riser.

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

The Patterson, Brixius, Grey Creek Watershed Project Dam No. 1 is located in the glaciated portion of the "Appalachian Uplands" (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by dissection of the uplifted but flat lying sandstones and shales of the middle and upper Devonian Catskill Delta. The plateau surface is represented by flat-topped divides with drainage generally southwest toward the Susquehanna River system.

Glacial cover is generally thin, although some north-south valleys are so thick that they are completely buried. The present surficial deposits have resulted primarily from glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation, approximately 11,000 years ago.

2.2 SUBSURFACE INVESTIGATION

A subsurface investigation was conducted by the Soil Conservation Service in 1965. This program consisted of 14 drill holes and 20 test pits at locations along the dam, auxiliary spillways, structural elements, and borrow area. Applicable subsurface information is included in Appendix F, Drawings #15 and 16.

In general, the soils in the vicinity of the dam are of glacial till or glacial lacustrine origin, and are silty gravel, clayey gravels, and sandy silts over shale bedrock. The permeability of these soils is low.

2.3 EMBANKMENT AND APPURTENANT STRUCTURES

The dam was designed and constructed under the supervision of the Soil Conservation Service. "As-Built" drawings of this dam are on file at the SCS office in Broome County. Selected drawings of the dam and appurtenances are included in Appendix F. The dam is composed of homogeneous earth fill, the maximum height of which is 65 feet, a cut-off trench having side slopes of 1 on 1, and a foundation drain parallel to the axis of the dam near the downstream toe. A reinforced concrete riser serves as the principal spillway and a vegetated channel serves as the auxiliary spillway.

2.4 CONSTRUCTION RECORDS

Complete construction records are available from the SCS office in Broome County. No major construction changes were instituted.

2.5 OPERATION RECORD

Since the dam is an ungated floodwater retarding structure, no operating records are maintained regarding water levels. During periods of extreme rainfall, SCS personnel do monitor the reservoir.

2.6 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from Mr. Gary Page, Project Engineer for SCS in Broome County, and Mr. Donald Lake, Head of the SCS Design Section in Syracuse, New York. This information appears to be adequate and reliable for Phase 1 Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Site #1 Dam was conducted on July 23, 1980. The weather was cloudy and the temperature ranged in the low 70's. The reservoir level at the time of the inspection approximately the invert of the low stage inlet of the service spillway riser (El.998.0).

b. Earth Embankment

No signs of distress were observed in connection with the earth embankment and no signs of misalignment, sloughing, seepage, subsidence, surface cracking or undesirable growth were noted. While no riprap was in use on the upstream slope for wave protection, no erosion was apparent. (See Photos #1 & 2)

Pedestrian and vehicular paths were noted on the crest and slopes of the embankment. These paths are a potential source of erosion. (Photos 5 & 6)

Near the downstream toe of the embankment on both sides of the impact basin erosion was evident. This erosion appears to be related to runoff from the embankment and the adjacent ball fields. (Photo #3)

Regrading in the area between the embankment and the auxiliary spillway was observed. A stockpile of soil was also evident near the outlet of the auxiliary spillway. Since no vegetation had been established on the regraded surface, erosion and slight ponding of runoff (from a previous storm) was noted. (Photo #5)

An internal drainage system composed of 2 - 8 inch diameter pipes surrounded by "drain fill" and extending parallel to the axis of the dam, provides drainage at the embankment-subgrade contact. These pipes exit through the concrete walls of the impact basin. Discharge from these pipes was 1 to 2 gpm each. The flow was clear. The animal guard on the left pipe was broken. (See Photo #3)

c. Service Spillway

The service spillway is generally in good condition. The maximum joint extension of the pipe is 0.5 inches. The joint between the pipe and the impact basin is open. The walls of the impact basin are slightly deteriorated. Calcification was noted from a crack or cold joint on the upstream wall about 1 foot above and to the right of the pipe. This area was dry at the time of the inspection.

d. Auxiliary Spillway

The grass lined service spillway beyond the right abutment is generally in good condition. Three ball fields were noted in the auxiliary channel, all with removable fences. Vehicular paths and soil stockpiles were noted in the channel. Vegetation was also evident on the slope between the auxiliary spillway and the embankment. (Photo #7)

e. Reservoir Drain

The 18 inch diameter reservoir drain pipe and manually operated slide gate, controls of which are located atop the riser, is reported to be operational.

f. Downstream Channel

The downstream channel below the impact basin is riprapped. Some vegetation was observed along the banks of this channel. (Photo #4)

g. Reservoir

There are no signs of instability or sedimentation problems within the reservoir area.

3.2 EVALUATION

The problem areas observed during the inspection which require remedial measures are as follows:

1. Pedestrian and vehicular traffic has created paths and depressions on the slopes of the embankment, at the abutments and in the auxiliary spillway channel. This traffic must be eliminated, the depressions filled and the area seeded to prevent erosion.
2. Erosion was evident near the toe of the embankment in the vicinity of the impact basin, at the right abutment, and between the auxiliary spillway outlet and the right abutment. These areas must be regraded and vegetation established as soon as possible.
3. Stockpiles of soil were observed in the auxiliary spillway channel and near the outlet of the channel. These stockpiles must be removed and the vegetation beneath the piles restored.
4. Recaulk the joint between the service spillway pipe and the wall of the impact basin.
5. The walls of the impact basin are slightly deteriorated and the left animal guard is broken. Repair the concrete surfaces of the impact basin and the animal guard.
6. Remove the vegetation on the slope between the right abutment and the auxiliary spillway channel, and along the banks of the downstream channel. Provide a program of periodic cutting and mowing of the dam and appurtenances. Also remove the debris in the approach channel of the auxiliary spillway.
7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is approximated by the low stage inlet of the service spillway. Downstream flows are limited by the 30 inch diameter service spillway pipe, except during extremely heavy runoff when the auxiliary spillway is in service. The dam provides 862 acre feet of flood storage between normal water level and the crest of the auxiliary spillway.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the County of Broome, New York. Maintenance of the dam is considered unsatisfactory as evidenced by the extensive vehicle and pedestrian paths which have initiated erosion on the slopes of the dam. In addition, erosion at the toe of the embankment near the impact basin and debris along the toe of the downstream slope were noted.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenant structures have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection."

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The drainage area above the Patterson Brixius Site 1 dam is 2829 acres or 4.42 square miles. Delineation of the watershed was made using the USGS 7.5 minute quadrangle, Maine, New York. The watershed consists of woodlands and some residences in a primarily rural setting. Relief ranges from moderate to fairly steep.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 21.0 inches (24 hrs., 200 sq. mi.) from Hydrometeorological Report #33 in accordance with recommended guidelines of the Corps of Engineers. The floods selected for analysis were 20, 40, 50, 60, 80, and 100% of the Probable Maximum Flood (PMF) flows. The PMF inflow of 7082 cfs was routed through the reservoir with no significant attenuation.

5.3 SPILLWAY CAPACITY

The spillway is a reinforced concrete drop inlet structure, 35 feet in height. It creates a weir length of 15 feet at elevation 1016.0, approximately 25. feet below top of dam. At auxiliary spillway crest elevation it has a capacity of 132 cfs. At top of dam, the service spillway and auxiliary spillway have a total capacity of 17,500 cfs.

5.4 RESERVOIR CAPACITY

The reservoir capacities at the crest of the spillway and the top of dam are 285 and 1280 acre feet respectively. Surcharge storage from spillway crest to auxiliary spillway crest and auxiliary spillway crest to top of dam are 2.63 and 1.59 inches of runoff.

5.5 FLOODS OF RECORD

The highest known water elevation was 1026.2 or 10.2 feet above the low level orifice (not yet reaching the service spillway crest). This occurred during September 1975, the estimated outflow of this storm is 95 cfs.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillways is 17,500 cfs before overtopping would occur. This capacity passes the full PMF inflow of 7,083 cfs with 3 feet freeboard. The routed 1/2 PMF outflow is 3,457 cfs.

5.7 EVALUATION

The spillway has a capacity to pass the total PMF and attenuate storm of greater frequency.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of distress were observed in connection with the earth embankment.

b. Design and Construction Data

A stability analysis was conducted by SCS during the design of the dam. The analyses were performed using the modified Swedish circle method. The soil parameters assumed were $\gamma_d = 122.8$, $\gamma_m = 137.0$, $\gamma_s = 140.5$, $\gamma_b = 78.0$, $\phi = 27^\circ$ $c = 300$. The results of these analyses are as follows:

<u>Condition</u>	<u>Minimum Factor of Safety</u>
1. Upstream slope = 1:3, full draw down 15' berm at el. 1006 & 10' berm at el. 995	1.45
2. Downstream slope = 1:2.5, drain at $c/b = 0.6$ No berm	1.58

The calculated factors of safety for this dam are in excess of the minimum factors recommended by the Corps of Engineers. The dam is, therefore, considered to have adequate factors of safety for stability. Further information concerning this analysis is included in Appendix E.

c. Post Construction Changes

No post construction changes were initiated. Removable fences for sporting activities have been installed in the auxiliary spillway.

d. Seismic Stability

The dam is located in Seismic Zone 1. Therefore, a seismic analysis is not warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of the Patterson Brixius Grey Creek Watershed Project Site 1 Dam did not reveal conditions which constitute a hazard to human life or property. The earth embankment is not considered to be unstable and appears capable of retarding floodwaters resulting from the PMF.

b. Adequacy of Information

The information reviewed appears adequate for Phase I Inspection purposes.

c. Need for Additional Investigation

No additional investigations are required at this time.

d. Urgency

Within 1 year of notification to the owner, the following remedial measures must be completed.

7.2 RECOMMENDED MEASURES

1. Eliminate the pedestrian and vehicular traffic on the embankment and auxiliary spillway, backfill all depressions and reseed these areas.
2. Repair the erosion and reseed the areas adjacent to the impact basin, at the toe of the right abutment, and the regraded area between the right abutment and the outlet of the auxiliary spillway. Also remove the stockpiles of soil in the auxiliary spillway channel and channel outlet, and reseed.
3. Recaulk the joint between the service spillway pipe and the impact basin wall. Repair the concrete surfaces of the impact basin, and repair the left animal guard.
4. Remove the vegetation along the left slope of the auxiliary spillway and on the banks of the downstream channel. Remove the debris in the approach channel of the auxiliary spillway. Provide a program of periodic cutting and mowing of the dam and appurtenances.
5. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

APPENDIX A

PHOTOGRAPHS



Photo #2
Upstream Slope & Riser

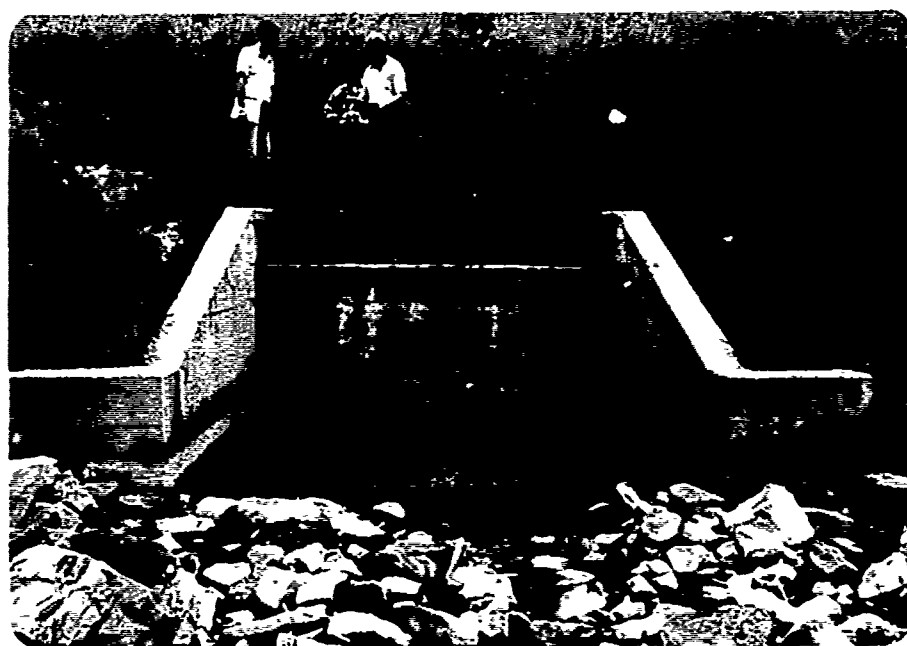


Photo #3
Impact Basin



Photo #4
Downstream Channel



Photo #5
Downstream Area
Viewed from Crest



Photo #6
Downstream Face - Left Abutment



Photo #7
Auxiliary Spillway & Right Abutment

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Paterson Bypass Creek S.D.
Fed. I.D. # NY 698 DEC Dam No. ECB-3457
River Basin Susquehanna
Location: Town Union County Bicome
Stream Name Paterson Creek
Tributary of Susquehanna River
Latitude (N) 42° 8.2' Longitude (W) 76° 1.3'
Type of Dam Earth Embankment
Hazard Category 'C' High
Date(s) of Inspection July 23, 1980
Weather Conditions Cloudy, Low 70's
Reservoir Level at Time of Inspection Approx Low Stage Inlet (El. 998.0)

b. Inspection Personnel James C. Varick, R. P. McCarty

c. Persons Contacted (Including Address & Phone No.)

Gary Page - Project Engr, SCS Binghamton
607-773-2751 Broomfield Ave Binghamton
Donald Lutz 315-423-5555 Syracuse SCS

d. History:

Date Constructed 1968 Date(s) Reconstructed —

Designer Soil Conservation Service

Constructed By R D Ballagline Corp.

Owner Bicome County, N.Y.

2) Embankment

a. Characteristics

- (1) Embankment Material glacial till
- (2) Cutoff Type earth
- (3) Impervious Core none
- (4) Internal Drainage System 2 8" diam cmp
collected in impact basin, drain fill around p-pis
- (5) Miscellaneous .

b. Crest

- (1) Vertical Alignment good
- (2) Horizontal Alignment good
- (3) Surface Cracks none
- (4) Miscellaneous bike and vehicular paths on crest,
slight depressions resulting

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1:3
- (2) Undesirable Growth or Debris, Animal Burrows none
- (3) Sloughing, Subsidence or Depressions depressions (slight)
from vehicular & pedestrian travel.

(4) Slope Protection none - earth berms (relative to 1st)
and normal water level

(5) Surface Cracks or Movement at Toe unobservable

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2.5

(2) Undesirable Growth or Debris, Animal Burrows none

(3) Sloughing, Subsidence or Depressions depressions (slight)
resulting from pedestrian & vehicular traffic
erosion near toe at impact basin (both sides) from ball field runoff

(4) Surface Cracks or Movement at Toe none

(5) Seepage none

(6) External Drainage System (Ditches, Trenches; Blanket) none

(7) Condition Around Outlet Structure erosion on both sides of
upstream wall due to runoff along toe & from ball fields

(8) Seepage Beyond Toe none evident

e. Abutments - Embankment Contact

earth to earth contact

- (1) Erosion at Contact erosion along toe from right abut = 60' to left
from recent grading; area regraded & large pile of soil left
- (2) Seepage Along Contact none
none outlet of auxiliary spillway between side & abt (right)
some ponded H₂O at toe near ball field from previous rain also some
erosion in regraded area

3) Drainage System

- a. Description of System 8" cnp parallel to axis of dam & outletting
in walls of impact basin
- b. Condition of System good - animal guard in left pipe
broken
- c. Discharge from Drainage System Approx 1 to 2 gpm from each
pipe

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

none

5) Reservoir

- a. Slopes good condition
- b. Sedimentation none reported
- c. Unusual Conditions Which Affect Dam —

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) immediately below dam
all fields & highway embankment Homes below embankment
- b. Seepage, Unusual Growth vegetation in downstream channel
- c. Evidence of Movement Beyond Toe of Dam none
- d. Condition of Downstream Channel riprapped

7) Spillway(s) (Including Discharge Conveyance Channel)

- Standard SCS Design
- a. General Service Spillway - riser, pipe & impact basin
auxiliary spillway - grass lined channel
- b. Condition of Service Spillway excellent
impact basin walls slightly deteriorated - joint between
wall & service spill. pipe open - needs caulking.
calcification on upstream wall of impact basin ~ 1' above & right
of pipe from slight crack or possible cold joint - dry during
inspection. pipe joint extension = max 1/2"

c. Condition of Auxiliary Spillway generally good - full fields
in sloped sections w/ removable fences - soil pile - & benches
Some debris in approach channel.
vegetation in ripraped slope between aux. & right abut.

d. Condition of Discharge Conveyance Channel

good - pedestrian & vehicular paths in
auxiliary channel have created depressions

8) Reservoir Drain/Outlet •

Type: Pipe ☒ Conduit _____ Other _____

Material: Concrete _____ Metal ☒ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): _____ Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

9) Structural

- a. Concrete Surfaces generally good
some slight deterioration of impact basin walls
- b. Structural Cracking none
- c. Movement - Horizontal & Vertical Alignment (Settlement) none evident
- d. Junctions with Abutments or Embankments adequate
- e. Drains - Foundation, Joint, Face drains operational
- f. Water Passages, Conduits, Sluices good condition
- g. Seepage or Leakage none evident

h. Joints - Construction, etc. _____

joint bet pipe (service spill) & imperv. wall
requires caulking

i. Foundation _____

unobservable

j. Abutments _____

N/A

k. Control Gates _____

operational

l. Approach & Outlet Channels _____

good condition

m. Energy Dissipators (Plunge Pool, etc.) _____

good condition

n. Intake Structures _____

good condition

o. Stability _____

appears acceptable

p. Miscellaneous _____

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1041.3</u>	<u>67.2</u>	<u>1250</u>
2) Design High Water (Max. Design Pool)	<u>1038.0</u>	<u>60.2</u>	<u>1019</u>
3) Auxiliary Spillway Crest	<u>1034.0</u>	<u>51.2</u>	<u>915</u>
4) Pool Level with Flashboards	<u>—</u>	<u>—</u>	<u>—</u>
5) Service Spillway Crest	<u>1016.0</u> <u>998.0 (low level outlet)</u>	<u>24.1</u>	<u>285</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>10.</u>
2) Spillway @ Maximum High Water	<u>160</u>
3) Spillway @ Design High Water	<u>152</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>132</u>
5) Low Level Outlet	<u>45</u>
6) Total (of all facilities) @ Maximum High Water	<u>17,500</u>
7) Maximum Known Flood	<u>—</u>
8) At Time of Inspection	<u>4 cfs</u>

CREST:

ELEVATION: 1241.3Type: hump over earth fillWidth: 30' Length: 1250'Spillover drop inlet service, grass lined channel auxiliaryLocation center, right abutment

SPILLWAY:

SERVICE

AUXILIARY

1216. Elevation 1034.drop inlet Type grass lined channel2.5 x 7.5' Width 340'

Type of Control

✓ Uncontrolled ✓

Controlled:

— Type —
(Flashboards; gate)— Number —— Size/length —Invert Material vegetatedAnticipated Length
of operating service 9 hrs.316' chute Length —25' Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow) 2:1 slope

Type : None

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

only controlled release through 18" drains.

DRAINAGE AREA: 4.42 mi.²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: some development, all over brush, etc. in rural

Terrain - Relief: relates to steep slopes

Surface - Soil: low permeability

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions))

high runoff potential - slopes - low permeability
increases in residence time

Potential Sedimentation problem areas (natural or man-made; present or future)

none

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

none

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: none

Elevation: _____

Reservoir:

Length @ Maximum Pool 3500 ft. (Miles)-

Length of Shoreline (@ Spillway Crest) 1100 ft. (Miles)

PAULSON BRIDGES SITE No 1

DA. 4.42 mi.

$L = 4.17$ mi.

$L_{ca} = 1.70$ mi

$C_t = 2.0$ or slightly lower due to steepness

$$t_p = C_t (L + L_{ca})^{0.3}$$

$$= 2.0 (4.17 + 1.70)^{0.3} = 3.6 \text{ hrs.}$$

$$t_r = \frac{t_p}{5.5} = \frac{3.6}{5.5} = 0.65$$

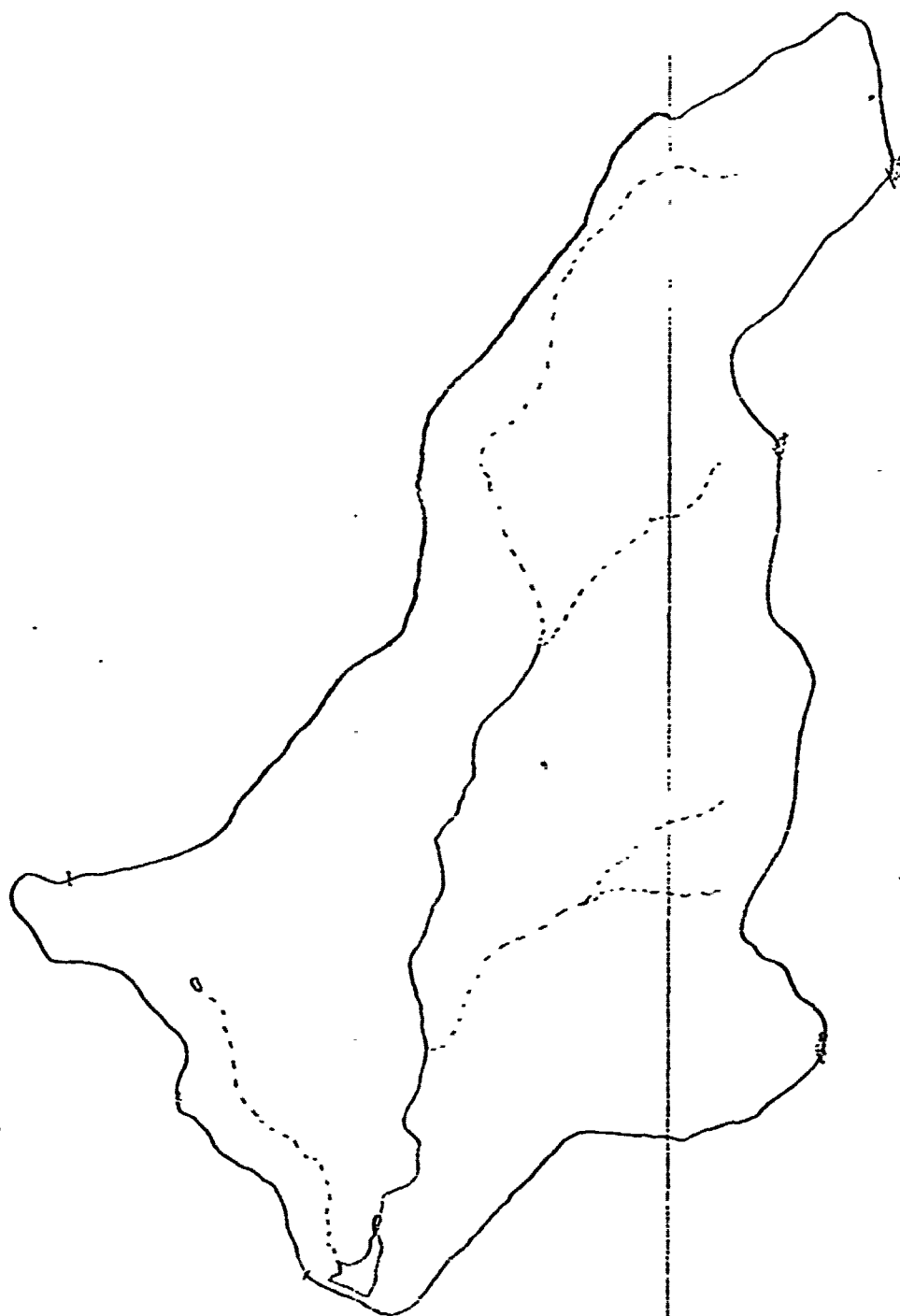
$$T_p = t_p + 0.5(t_r) = 3.925 \text{ hr.}$$

$$C_p = 0.625$$

PAULSON: PWD (H₁₀₀ #CE) 21.0" $\frac{1}{8}$ 111 123 133 142

Spillway/Reservoir CHARACTERISTICS :	EL (SCS)	Q (cfs)	SL (ft.)
	922.	-	0
invert of culvert	995.0	-	43.4
plane spillway crest	1016.0	50	285.0
energy " crest	1034.0	132	905.0
design high $\frac{3}{8}$	1038.0	6210	1069.0
T of Dam	1041.3	17500	1280.0

$$L = 1250' \quad C = 3.0$$



$$1.92 \text{ mi.}^2$$

$$L = 9 \left(\frac{2400}{12(525)} \right) = 4.17 \text{ mi.}$$

$$L_u = 4.5 \left(\frac{2400}{12(525)} \right) = 1.70 \text{ mi.}$$

$$S = \frac{(120 - 40)2}{(525) - 400} = .017$$

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A large grid of dots for handwriting practice. On the left side, a dashed line forms the letter 'A'. The rest of the grid consists of a regular pattern of dots for tracing or independent writing.

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1015.4 1015.5 1015.6 1015.7 1015.8 1015.9 1016.0 1016.1 1016.2 1016.3 1016.4

1016.5 1016.6 1016.7 1016.8 1016.9 1017.0 1017.1 1017.2 1017.3 1017.4 1017.5

1017.6 1017.7 1017.8 1017.9 1018.0 1018.1 1018.2 1018.3 1018.4 1018.5 1018.6

1018.7 1018.8 1018.9 1019.0 1019.1 1019.2 1019.3 1019.4 1019.5 1019.6 1019.7

1019.8 1019.9 1020.0 1020.1 1020.2 1020.3 1020.4 1020.5 1020.6 1020.7 1020.8

1020.9 1021.0 1021.1 1021.2 1021.3 1021.4 1021.5 1021.6 1021.7 1021.8 1021.9

1022.0 1022.1 1022.2 1022.3 1022.4 1022.5 1022.6 1022.7 1022.8 1022.9 1023.0

2115

[illegible]

100	10	0	100	10	0
1.00	1.00	1.00	1.00	1.00	1.00
1.05	1.05	1.05	1.05	1.05	1.05
1.10	1.10	1.10	1.10	1.10	1.10
1.15	1.15	1.15	1.15	1.15	1.15
1.20	1.20	1.20	1.20	1.20	1.20
1.25	1.25	1.25	1.25	1.25	1.25
1.30	1.30	1.30	1.30	1.30	1.30
1.35	1.35	1.35	1.35	1.35	1.35
1.40	1.40	1.40	1.40	1.40	1.40
1.45	1.45	1.45	1.45	1.45	1.45
1.50	1.50	1.50	1.50	1.50	1.50
1.55	1.55	1.55	1.55	1.55	1.55
1.60	1.60	1.60	1.60	1.60	1.60
1.65	1.65	1.65	1.65	1.65	1.65
1.70	1.70	1.70	1.70	1.70	1.70
1.75	1.75	1.75	1.75	1.75	1.75
1.80	1.80	1.80	1.80	1.80	1.80
1.85	1.85	1.85	1.85	1.85	1.85
1.90	1.90	1.90	1.90	1.90	1.90
1.95	1.95	1.95	1.95	1.95	1.95
2.00	2.00	2.00	2.00	2.00	2.00
2.05	2.05	2.05	2.05	2.05	2.05
2.10	2.10	2.10	2.10	2.10	2.10
2.15	2.15	2.15	2.15	2.15	2.15
2.20	2.20	2.20	2.20	2.20	2.20
2.25	2.25	2.25	2.25	2.25	2.25
2.30	2.30	2.30	2.30	2.30	2.30
2.35	2.35	2.35	2.35	2.35	2.35
2.40	2.40	2.40	2.40	2.40	2.40
2.45	2.45	2.45	2.45	2.45	2.45
2.50	2.50	2.50	2.50	2.50	2.50
2.55	2.55	2.55	2.55	2.55	2.55
2.60	2.60	2.60	2.60	2.60	2.60
2.65	2.65	2.65	2.65	2.65	2.65
2.70	2.70	2.70	2.70	2.70	2.70
2.75	2.75	2.75	2.75	2.75	2.75
2.80	2.80	2.80	2.80	2.80	2.80
2.85	2.85	2.85	2.85	2.85	2.85
2.90	2.90	2.90	2.90	2.90	2.90
2.95	2.95	2.95	2.95	2.95	2.95
3.00	3.00	3.00	3.00	3.00	3.00
3.05	3.05	3.05	3.05	3.05	3.05
3.10	3.10	3.10	3.10	3.10	3.10
3.15	3.15	3.15	3.15	3.15	3.15
3.20	3.20	3.20	3.20	3.20	3.20
3.25	3.25	3.25	3.25	3.25	3.25
3.30	3.30	3.30	3.30	3.30	3.30
3.35	3.35	3.35	3.35	3.35	3.35
3.40	3.40	3.40	3.40	3.40	3.40
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3.60	3.60	3.60	3.60	3.60	3.60
3.65	3.65	3.65	3.65	3.65	3.65
3.70	3.70	3.70	3.70	3.70	3.70
3.75	3.75	3.75	3.75	3.75	3.75
3.80	3.80	3.80	3.80	3.80	3.80
3.85	3.85	3.85	3.85	3.85	3.85
3.90	3.90	3.90	3.90	3.90	3.90
3.95	3.95	3.95	3.95	3.95	3.95
4.00	4.00	4.00	4.00	4.00	4.00
4.05	4.05	4.05	4.05	4.05	4.05
4.10	4.10	4.10	4.10	4.10	4.10
4.15	4.15	4.15	4.15	4.15	4.15
4.20	4.20	4.20	4.20	4.20	4.20
4.25	4.25	4.25	4.25	4.25	4.25
4.30	4.30	4.30	4.30	4.30	4.30
4.35	4.35	4.35	4.35	4.35	4.35
4.40					

PER FLJ. AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECCENTRIC COMPUTATIONS
 FLTS IN CUBIC FEET PER SEC C (CUBIC METERS PER SECOND)
 AREA IN SQUARE FEET (SQUARE METERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLENS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
PERIOD 1	1	4.42	1	14.70	2833.	3541.	4249.	5065.	7082.
	(1 20.34)		(	40.11)	(80.21)	(100.27)	(120.32)	(160.43)	(200.53)
PERIOD 10	1	4.42	1	310.	2632.	3457.	4195.	5012.	7053.
	(1 20.34)		(	10.76)	(74.54)	(97.90)	(118.91)	(158.52)	(199.73)

COMPARISON OF C/P SUPPLY ANALYSIS

DATE	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	TIME OF FAILURE	TIME OF FAILURE
11/11/66	1041.3	1041.3	1041.3	1250.	17500.
ST. ALB.	2.5	2.5	2.5	50.	50.
10.	10.	10.	10.	10.	10.
DATE	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	TIME OF FAILURE	TIME OF FAILURE
11/11/66	1041.3	1041.3	1041.3	1250.	17500.
ST. ALB.	2.5	2.5	2.5	50.	50.
10.	10.	10.	10.	10.	10.

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).
- 3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.
- 5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

STABILITY ANALYSIS

UNITED STATES GOVERNMENT

Memorandum

TO : W. S. Atkinson, State Conservation DATE: April 20, 1965
Engineer, SCS, Syracuse, New York 13210

FROM : Rey S. Decker, Head, Soil Mechanics Laboratory,
SCS, Lincoln, Nebraska 68508

SUBJECT: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1
(Broome County)

ATTACHMENTS

1. Form SCS-354, Soil Mechanics Laboratory Data, 1 sheet.
2. Form SCS-355, Triaxial Shear Test Data, 1 sheet.
3. Form SCS-352, Compaction and Penetration Resistance Report, 4 sheets.
4. Form SCS-353, Grain Size Distribution Graph, 1 sheet.
5. Form SCS-357, Summary - Slope Stability Analysis, 2 sheets.
6. Investigational Plans and Profiles.

DISCUSSION

FOUNDATION

- A. Classification: The foundation conditions and materials at this site are clearly outlined and well depicted in the geology report.

The abutments consist of till that is logged as a dense to very dense GM. This till contains approximately 15 percent material larger than 3 inches with numerous cobbles and flags larger than 6 inches.

The emergency spillway samples 65W2618, 65W2619 and 65W2620 are representative of the till at the surface on the abutments. Samples from the emergency spillway contain slightly less than 50 percent fines and are classed as GC.

The materials in the floodplain section consist of a dense till overlying gravels and silts of lacustrine origin. The lacustrine sediments in turn overlie a dense glacial till.

The surface till zone is about 8 feet thick. This material contains approximately 60 percent gravel and 20 percent fines. Laboratory sample 65W2617 is representative. The lacustrine gravels range from a few feet thick to 10 feet thick. Field samples indicate that these materials contain from 50 to 60 percent material passing the No. 4 sieve and from about 10 to 20 percent fines. The lacustrine silts contain approximately 90 percent fines. The till in the surface zone is classed as a GC-GM.

2 -- W. S. Atkinson -- 4/20/65

Rey S. Decker

Subj: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1
(Broome County)

Gradation curves for the lacustrine materials are included in the geology report.

- B. Blow Count: Blow count in the surface till zone was generally above 30 blows/foot. Tests in the surface couple feet in DH 3 and DH 4 showed blow counts of 19 and 13 blows, respectively. The material in this zone is logged as moist to wet but a water table is not indicated.

The lacustrine material below the surface till zone has blow count values ranging from 36 to more than 100 blows/foot on centerline. The ML zone in Test Hole 302 downstream from centerline had blow counts in the range of 15 to 19 blows/foot. The materials within the lacustrine zone are generally logged as wet and seepage was noted in some locations.

- C. Shear Strength and Consolidation: Undisturbed samples were not submitted. The blow count data indicated a relatively strong foundation with a low consolidation potential for the loading range planned.

The fine fraction of these materials is somewhat plastic and blow count could possibly be lower if the moisture content was not near theoretical saturation at the time of test.

- D. Permeability: With the exception of the GW in the bottom of the channel, the permeability of the foundation material is expected to be relatively low for each class of material. The lacustrine gravel is expected to be the most pervious material other than the stream channel gravels. The D_{10} size of the lacustrine gravel is about 0.074 mm. or less. The blow count indicates a relatively dense gravel; therefore, we estimate the permeability rate will be in the range of 1 to 5 feet per day or less, depending upon the amount of fines.

EMBANKMENT

- A. Classification: The embankment material will come from the emergency spillway. Three samples were submitted from the spillway. The samples indicate that the till from the spillway is very uniform. It contains slightly less than 50 percent fines and is classed as a GC. The liquid limit is near 30 and the PI is about 12. About 15 percent of the material is larger than the 3-inch size.
- B. Compacted Density: Standard Proctor compaction tests were made on the three samples submitted. The tests were made on the fraction finer than 3/4 inch in accordance with ASTM D-698T, Method C. The maximum density obtained was 125 p.c.f. for all three samples.

3 -- W. S. Atkinson -- 4/20/65

Rey S. Decker

Subj: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1
(Broome County)

A standard Proctor test was made on the minus No. 4 fraction of Sample 65W2619 for correlation purposes. The density obtained was 119 p.c.f. Based on the density and the percent of the material larger than the No. 4 sieve size included in the compaction sample for the minus 3/4-inch test, computations show that the density of the minus 4 fraction within this test sample was also 119 p.c.f. This indicates that the gravel fraction did not interfere with compaction of the minus 4 fraction in the 1/30 cubic foot compaction mold.

- C. Shear Strength: A triaxial shear test was made on Sample 65W2619. The test was made on the minus 3/4-inch fraction at a density of approximately 98 percent of standard Proctor. A consolidated, undrained test was made and pore pressure was measured during the test. The effective stress shear strength values obtained were $\phi = 27^\circ$, $c = 300$ p.s.f. and the total stress shear values obtained were $\phi = 19^\circ$, $c = 325$ p.s.f.

The test values are considered representative of the borrow materials for a placement density of 98 percent of standard Proctor and are suggested for design.

SLOPE STABILITY

Slope stability was checked with a modified Swedish circle method of analysis. The analysis was made on the maximum embankment section and the trial failure arcs were limited to the embankment only.

A phreatic line was assumed from emergency spillway elevation to a drain at $c/b = 0.6$.

The analysis shows that the proposed 2 1/2:1 downstream slope with a drain has a factor of safety of 1.58.

A 3:1 upstream slope with a 10-foot berm at elevation 995 has a factor of safety of 1.36 with complete rapid drawdown considered. The addition of a 15-foot berm at elevation 1006 plus the 10-foot berm at elevation 995 results in a factor of safety of 1.48, which is very near the suggested minimum of 1.50 when effective stress shear parameters are used in the analysis.

SETTLEMENT ANALYSIS

The consolidation potential is expected to be low. The foundation conditions appear to be uniform and differential settlement is not expected to be a problem. The channel banks are near vertical in some places, however, and some differential might occur in this area.

SOIL MECHANICS LABORATORY
TRIAxIAL SHEAR TEST DATASample Number 65W2619Project Patterson Creek #1Location New York

Moisture-Density Data

Standard ☒ 125.0 pcf
Modified ☐ Method C
Curve No. 2 of 3 Optimum Moisture 11.5 %L.L. 31 P.L. 12 Class G_s 2.74% Finer Than: 0.002mm 18 0.005mm 26 #200

Other Factors Affecting Shear:

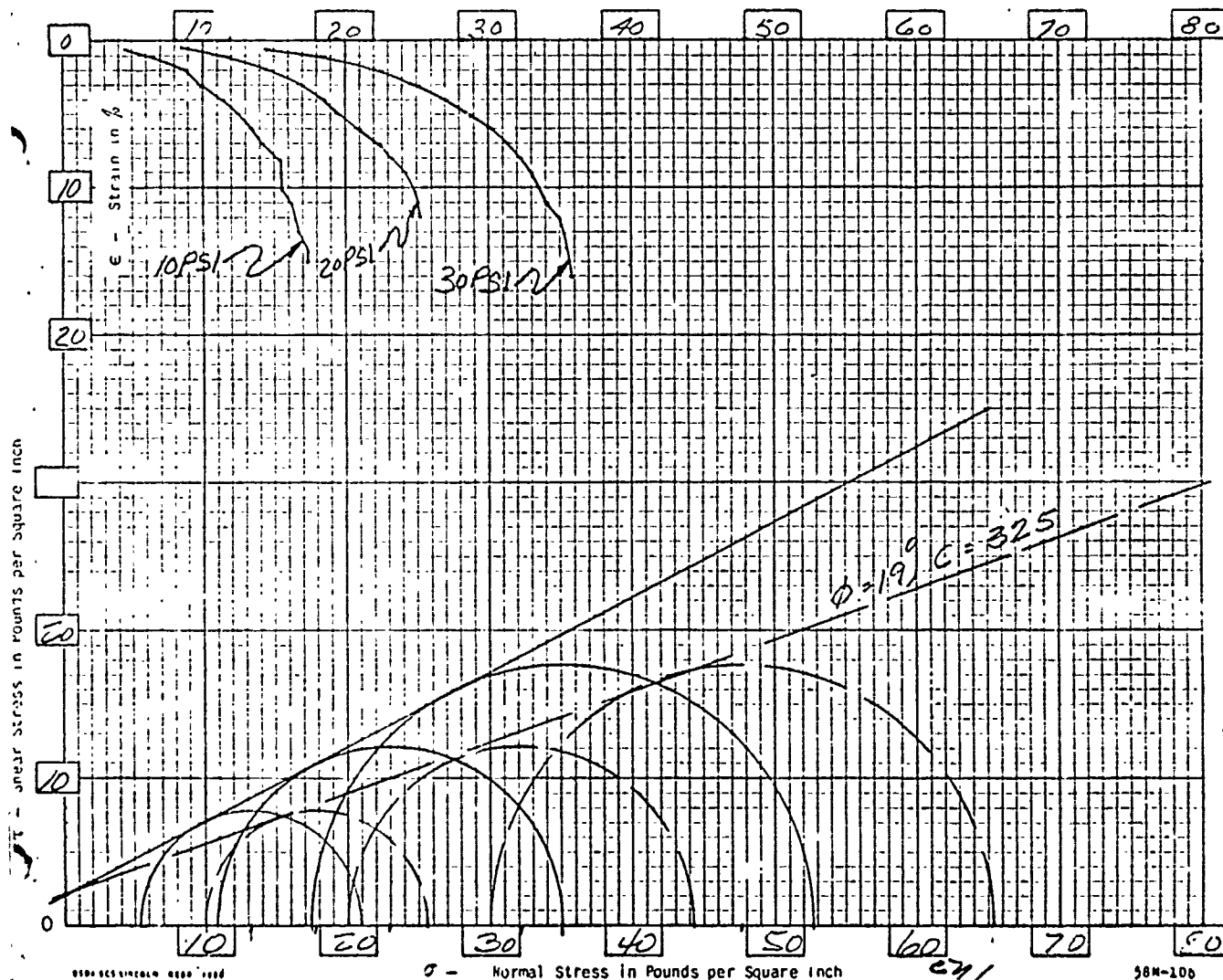
% Dispersion % Salt Other:

Specifications:

Specimen: Max. 3/4" ☒ Consolidated ☐ Drained
Height Size 3/4" ☐ Unconsolidated ☒ Undrained
Diameter 1.0" Material Pore Pressure Measured☐ Undisturbed and Tested at: ☐ Natural Moisture ☐ Saturation☒ Remolded and Tested at: 98 % of ☒ Standard ☐ Modifiedwith w = % which is☐ Lower than Optimum ☐ Optimum ☐ Higher than Optimum ☐ Saturated

Test Data

No.	Dry Density γ pcf	% Max. Dry Den.	Moisture Content			Lateral Pressure σ_3	Consolidation Data		Stress at Failure $\sigma_1 - \sigma_3$	% Strain at Failure ϵ	Internal Friction ϕ Tan ϕ	Unit Cohesion c
			Start %	% Sat. at Start	End %		Orig. e_0	Final e_f				
4.0	123.0	98.5	14.1	98.6	13.3	10 $\frac{1}{2}$	.391	.370	15.5	8.2	ϕ	
7.2	123.0	98.5	14.5	100.0	13.2	20 $\frac{1}{2}$	.391	.363	24.3	9.0	27°	20 psi
2.6	122.4	98.0	14.4	99.3	12.4	30 $\frac{1}{2}$	.398	.393	35.3	13.1	Tan ϕ	300 psf

 $\sigma_1 - \sigma_3$ in Pounds per Square Inch σ - Normal Stress in Pounds per Square Inch

38M-108

4 -- W. S. Atkinson -- 4/20/65

Roy S. Decker

Subj: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1
(Broome County)

RECOMMENDATIONS

- A. Site Preparation: Normal site preparation should be adequate to remove any loose materials at the surface.

We recommend that the channel banks be flattened to insure a good bond between the backfill and the foundation and to reduce the possibility of critical differential settlement in this area.

- B. Cutoff: The Geologist suggested a shallow cutoff trench. We concur with this suggestion. A minimum trench depth of about 5 feet is suggested to insure that the trench bottoms below the zone affected by roots, rodents, cracking, etc.

The trench backfill may consist of GC material from the emergency spillway. The backfill should be compacted to a minimum of 98 percent of standard Proctor density.

- C. Principal Spillway: The proposed principal spillway location is at Station 8+00. The foundation material at this location consists of till upstream from centerline. Downstream from centerline the foundation contains about a 4-foot zone of lacustrine silt and sand between layers or zones of till. The blow count within the lacustrine silt ranges from 15 to 19 blows per foot and blow count below the surface foot or two in the till is in excess of 30 blows per foot.

The conduit will be bedded in dense till and dense lacustrine silts. The consolidation potential is expected to be low and no unusual problems are anticipated.

Based on blow count, permeability is expected to be low. If zones or stratum of pervious materials are encountered in the lacustrine materials, it might be desirable to encompass the conduit with a filter drain.

The Geologist points out that the material at grade is erodible.

- D. Drain: A drain is recommended to control the phreatic line in the embankment and to provide a safe outlet for underseepage. A trench drain with a pipe outlet is suggested. We concur with the trench depths suggested in the geologic report. At these depths the trench will bottom in the most pervious zones. The trench depths suggested are as follows:

5 -- W. S. Atkinson -- 4/20/65

Rey S. Decker

Subj: ENG 22-5, New York WP-08, Patterson Creek, Site No. 1
(Broome County)

<u>T.P.</u>	<u>Suggested Trench Depth</u>	<u>Material at the Trench Bottom Logged As</u>
508	6 feet	Till
503	5 feet	Till
302	12 feet	SM with gravel streaks
502	14 feet	SM with gravel streaks
501	14 feet	SM with gravel streaks
504	12 feet	SM
509	8 feet	GM-GW

The suggested filter limits are shown on the attached Form SCS-353.
The suggested limits are such that ASTM No. 78 road gravel may be used.

E. Embankment Design:

1. Placement of Material. The borrow materials consist of a uniform glacial till from the emergency spillway; therefore, a homogeneous embankment is recommended. The borrow material should be placed at a minimum of 98 percent of standard Proctor density with the control based on the minus 3/4-inch fraction. The placement moisture content should be slightly wet of optimum.
2. Slopes. The proposed 2 1/2:1 downstream slope has an acceptable factor of safety and is recommended. The proposed 3:1 upstream slope with a 10-foot berm at elevation 995 requires modification to obtain an acceptable factor of safety. The stability analysis shows that the addition of another berm 15 feet wide at elevation 1006 results in a factor of safety of 1.48. This addition or a comparable modification is recommended.
3. Settlement. An overfill allowance of 1.5 feet is suggested to compensate for residual consolidation within the fill and foundation.

Prepared by:

Lorn P. Dunnigan
Lorn P. Dunnigan

Attachments

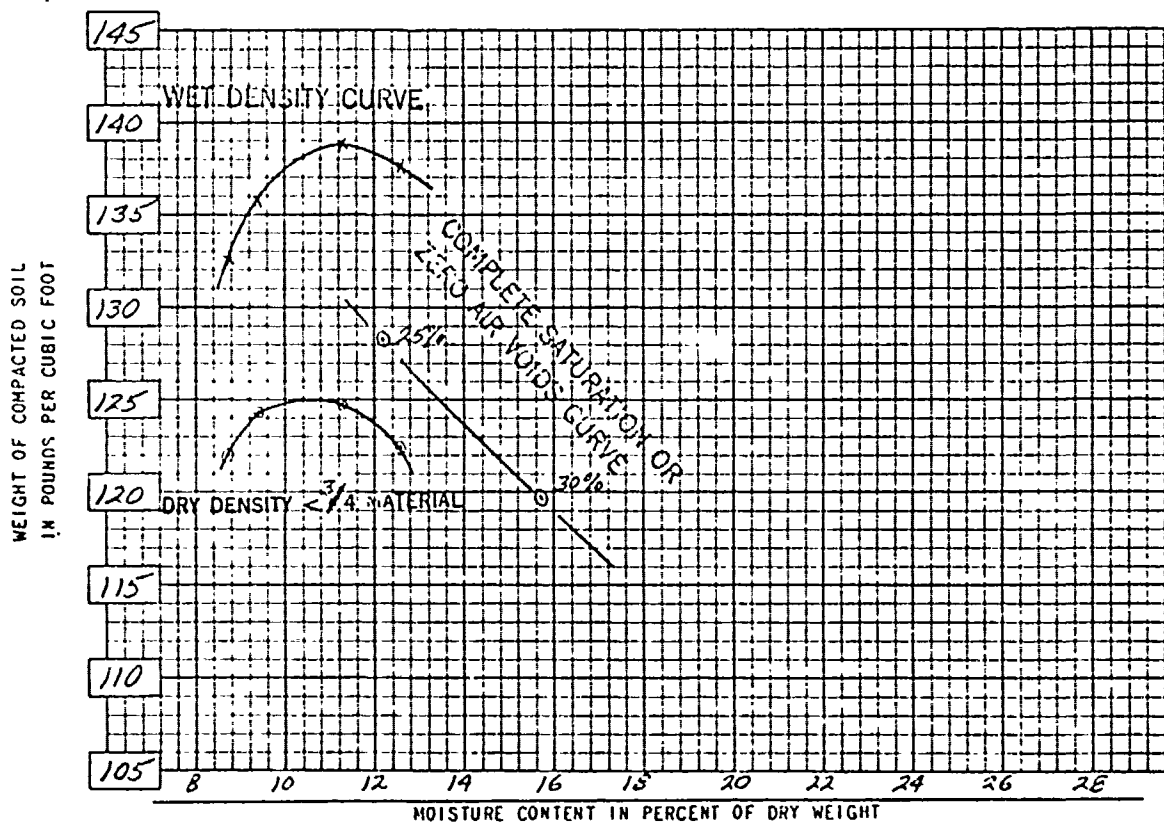
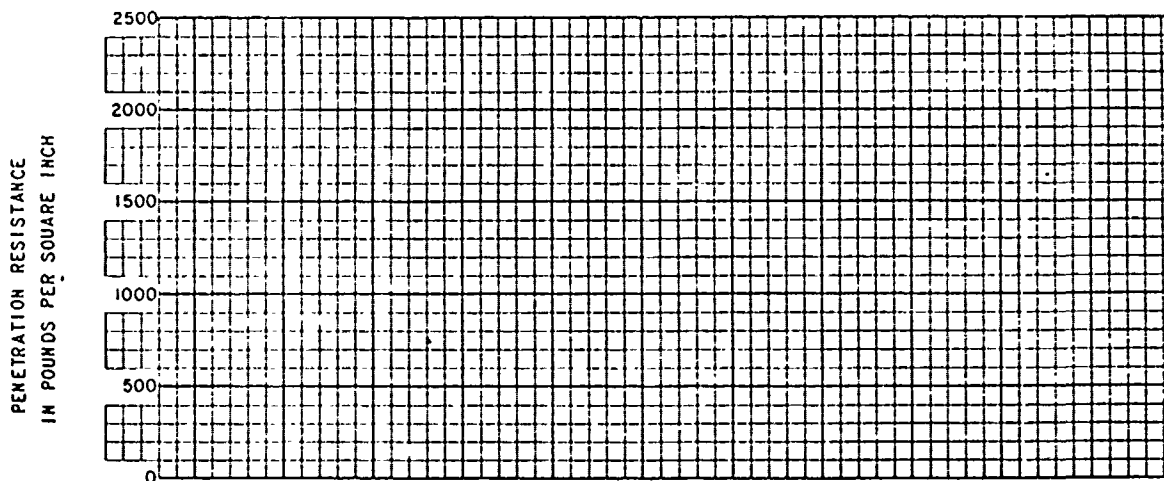
cc: B. S. Ellis, Syracuse, N. Y.
Henry W. Davis, Penn Yan, N. Y.
R. J. McClimans, Binghamton, N.Y.
H. M. Kautz, Upper Darby, Pa.

Reviewed and Approved by:

R. B. Phillips
Roland B. Phillips

COMPACTION AND PENETRATION RESISTANCE REPORT

Date _____ Sample No.: Field 208.1 Lab 65W2618
 Project Patterson Creek #1 Location New York
 Sample Location and Depth Emergency Spillway 2.0'-12.0'

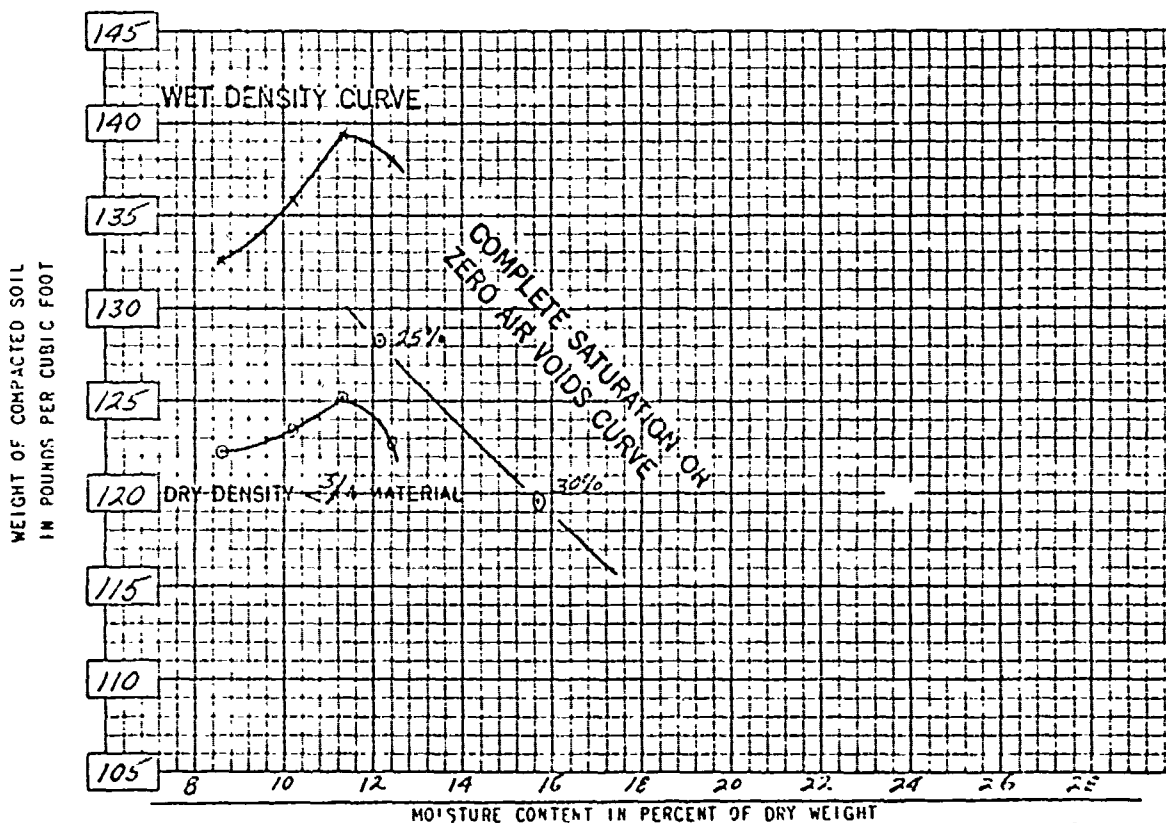
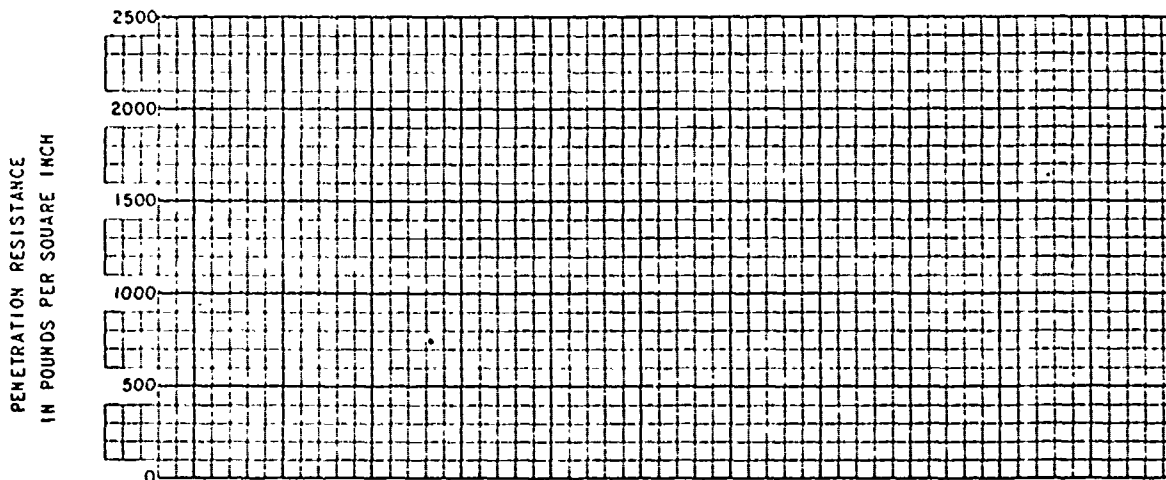


TYPE OF TEST	TEST PROCEDURE	Classification
<input checked="" type="checkbox"/> Standard Proctor	Weight of Hammer <u>5.5</u> Lbs.	Material compacted represents
<input type="checkbox"/> Modified AASHO	Drop <u>12</u> Inches	<u>73</u> percent of the sample
<input type="checkbox"/> Other _____	Lifts <u>3</u>	and passed <u>3/4"</u> sieve
	Vol. of Cylinder <u>1/30</u> Cu.Ft.	(Sp. Gr.) $G_s = 2.74$
		Curve <u>1</u> of <u>3</u>

ASTM D698-SBT Method C

COMPACTION AND PENETRATION RESISTANCE REPORT

Date _____ Sample No. Field 209.1 Lab 65W/2619
 Project Patterson Creek #1 Location New York
 Sample Location and Depth Emergency Spillway 2.0'-12.0'

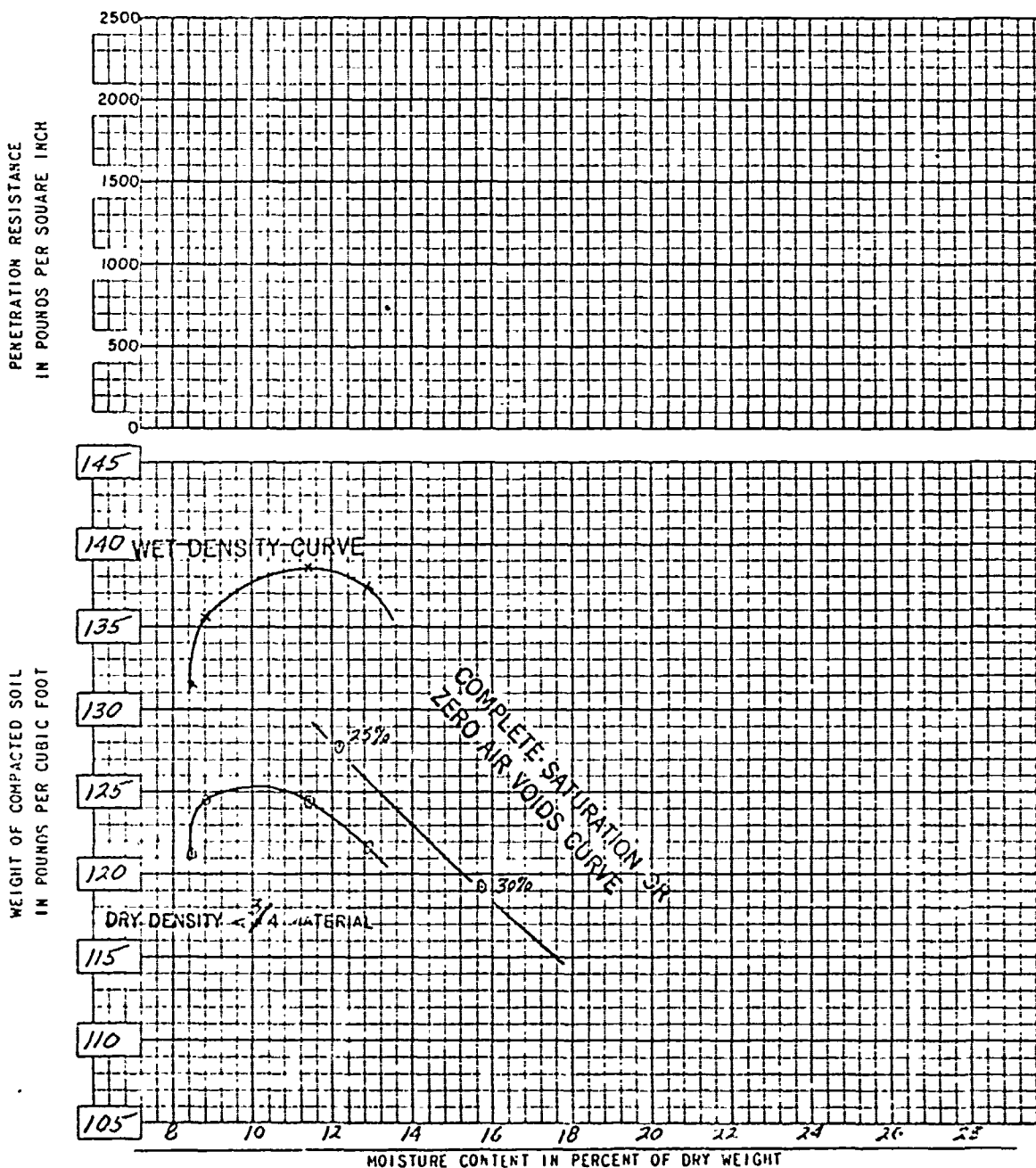


TYPE OF TEST	TEST PROCEDURE	Classification
<input checked="" type="checkbox"/> Standard Proctor	Weight of Hammer <u>5.5</u> Lbs.	Material compacted represents
<input type="checkbox"/> Modified AASHO	Drop <u>12</u> Inches	<u>75</u> percent of the sample
<input type="checkbox"/> Other _____	Lifts <u>3</u>	and passed <u>3/4</u> sieve
	Vol. of Cylinder <u>1/30</u> Cu.Ft.	(Sp. Gr.) $G_s = 2.74$
		Curve <u>2</u> of <u>3</u>

ASTM D698-58T Method C

COMPACTION AND PENETRATION RESISTANCE REPORT

Date _____ Sample No. & Field 210.1 Lab 65W2620
 Project Patterson Creek #1 Location New York
 Sample Location and Depth Emergency Spillway 2.0-12.0'



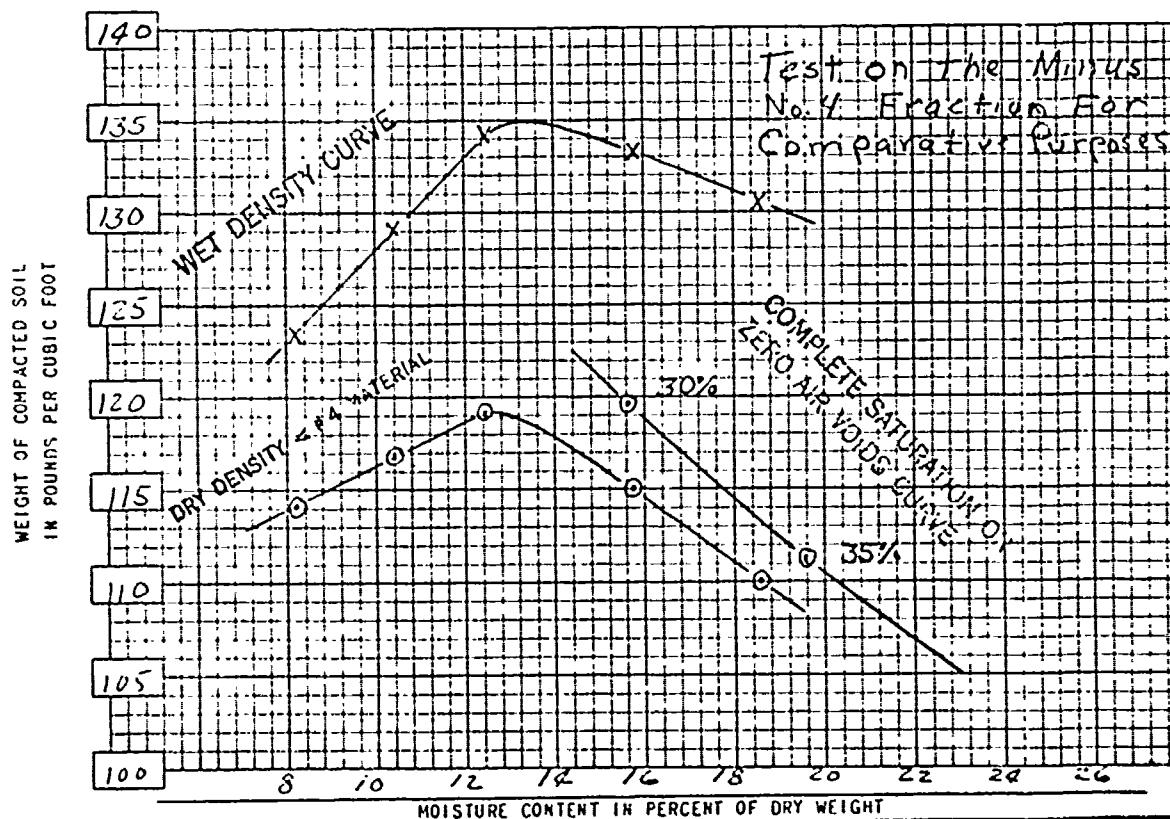
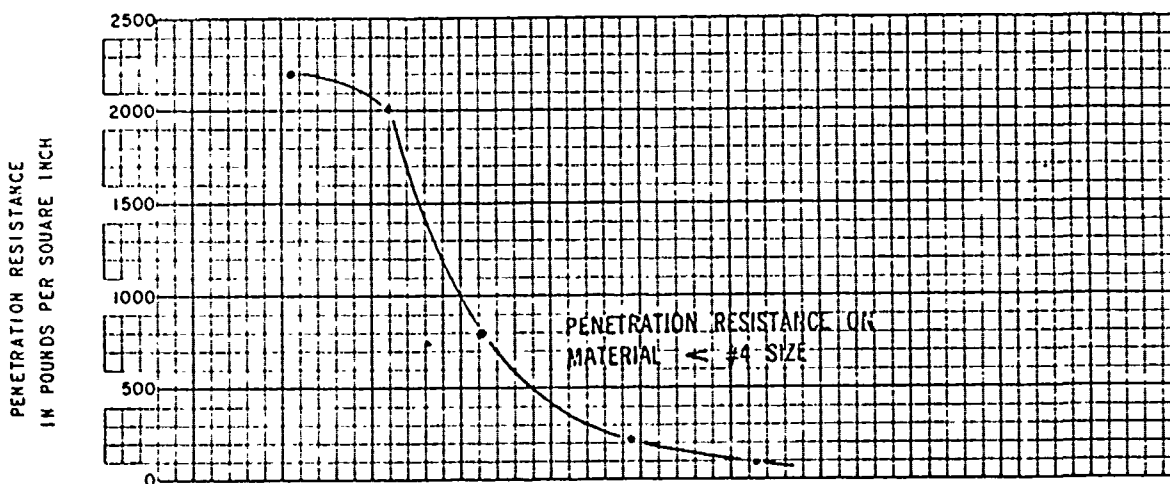
TYPE OF TEST	TEST PROCEDURE	Classification
<input checked="" type="checkbox"/> Standard Proctor	Weight of Hammer <u>5.5</u> Lbs.	Material compacted represents
<input type="checkbox"/> Modified AASHO	Drop <u>12</u> Inches	<u>74</u> percent of the sample
<input type="checkbox"/> Other _____	Lifts <u>3</u>	and passed <u>3/4"</u> sieve
	Vol. of Cylinder <u>1/30</u> Cu.Ft.	(Sp. Gr.) $G_s = 2.73$
		Curve <u>3</u> of <u>3</u>

ASTM D698-58T Method C

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 SOIL MECHANICS LABORATORY

COMPACTION AND PENETRATION RESISTANCE REPORT

Date _____ Sample No.: Field 209.1 Lab 65W2619
 Project Patterson Creek No. 1 Location New York
 Sample Location and Depth Emergency Spillway 20'-12.0'



TYPE OF TEST	TEST PROCEDURE	Classification
<input checked="" type="checkbox"/> Standard Proctor	Weight of Hammer <u>5.5</u> Lbs.	Material compacted represents <u>75</u> percent of the sample and passed <u>#4</u> sieve
<input type="checkbox"/> Modified AASHO	Drop <u>12</u> Inches	(Sp. Gr.) Gs= <u>2.74</u>
<input type="checkbox"/> Other _____	Lifts <u>3</u>	Curve _____ of _____
	Vol. of Cylinder <u>1/30</u> Cu.Ft.	

SUMMARY - SLOPE STABILITY ANALYSIS

Sheet 1 of 2

Maximum Section

State NEW YORK Project PATTERSON CREEK SITE #1

Date 7-13-65 Analysis Made By G.M.G.F.A.W.L. Checked By A.W.L.

Method of Analysis SWEDISH CIRCLE

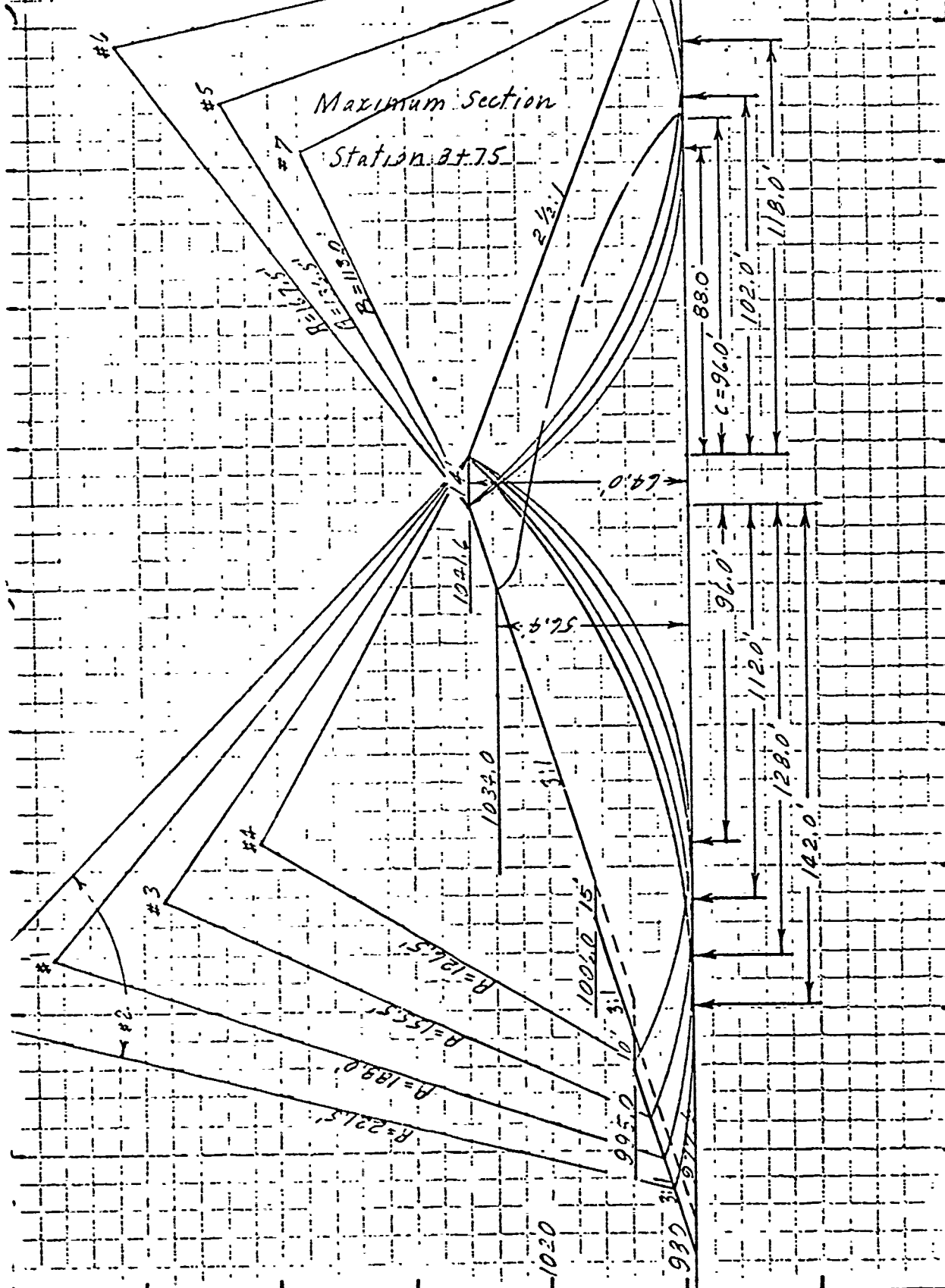
To be used to report to field offices data used for slope stability analyses and the results of the analyses.
The right side of the form will be used for a sketch of the embankment on which the analyses have been made.

Location of Material											
Sample No.											
γ_d											
γ_m											
γ_s											
γ_b											
Condition	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	Opt.	Sat.	
ϕ											
Tan ϕ											
K											
C											

UPSTREAM SLOPE			
Trial	Slope	Conditions	Fs
1	3:1	Full br. down - 10' berm @ elev. 995 - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.36
1A	3:1	Same as #1 except 15' berm @ elev. 1004 & 10' berm @ elev. 995.0	1.49
2	3:1	Full br. down - 15' berm @ elev. 1022 & 10' berm @ elev. 995 - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.56
3	3:1	Full br. down - 15' berm @ elev. 1022 & 10' berm @ elev. 995 - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.45
4	3:1	Full br. down - 15' berm @ elev. 1022 & 10' berm @ elev. 995 - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.43

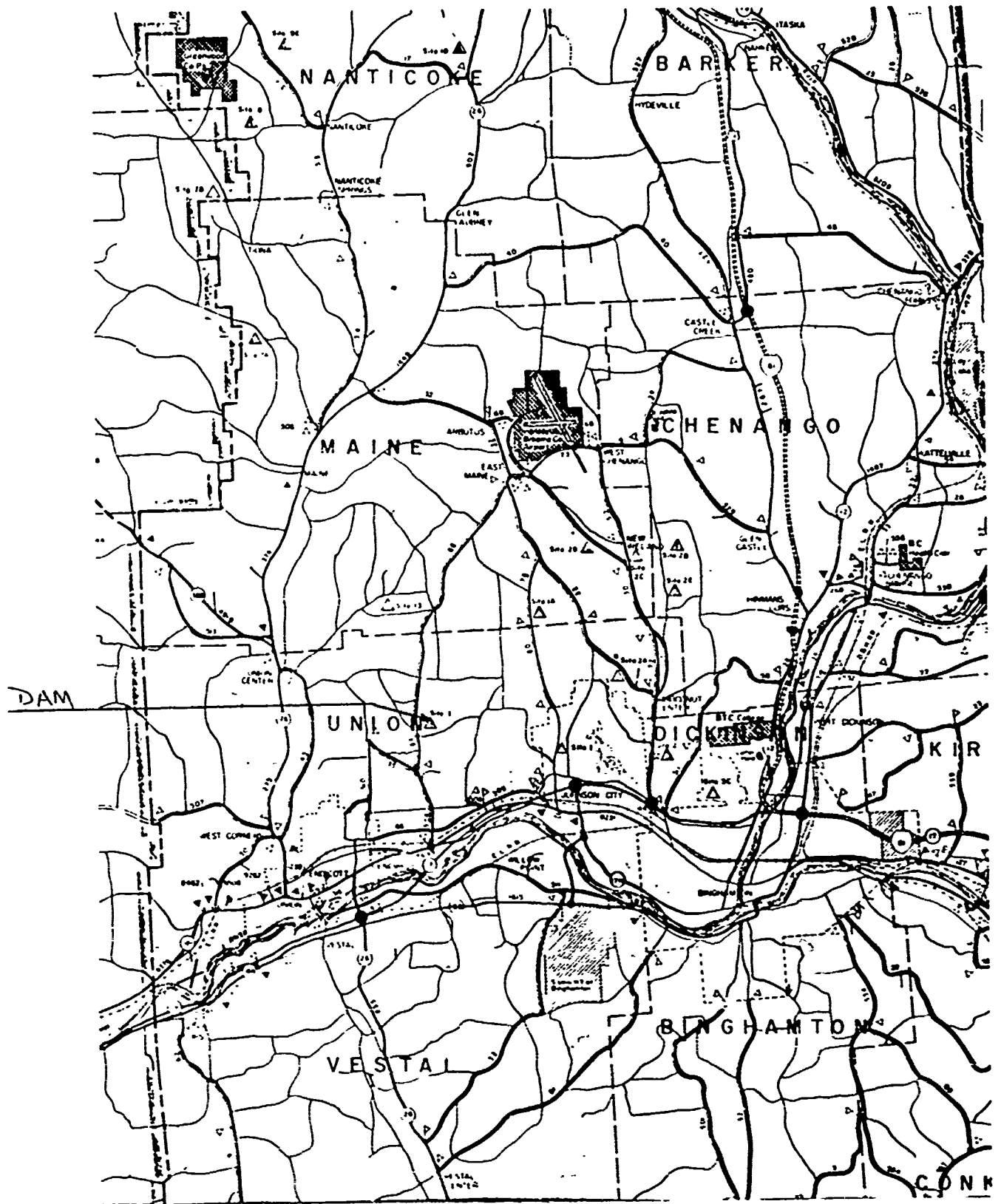
DOWNSTREAM SLOPE			
Trial	Slope	Conditions	Fs
5	2 1/2:1	Crain @ $\gamma_b = 0.6$ - No berm - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.52
6	2 1/2:1	Crain @ $\gamma_b = 0.6$ - No berm - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.62
7	2 1/2:1	Crain @ $\gamma_b = 0.6$ - No berm - Arc cut from opp. side thru Emh (27.0°-30.0°) only	1.60
		No'te - Sat. shear values only.	

(SCS-357)
 Continuation of Sheet 1 of 2
 Patterson Creek Site #1
 New York

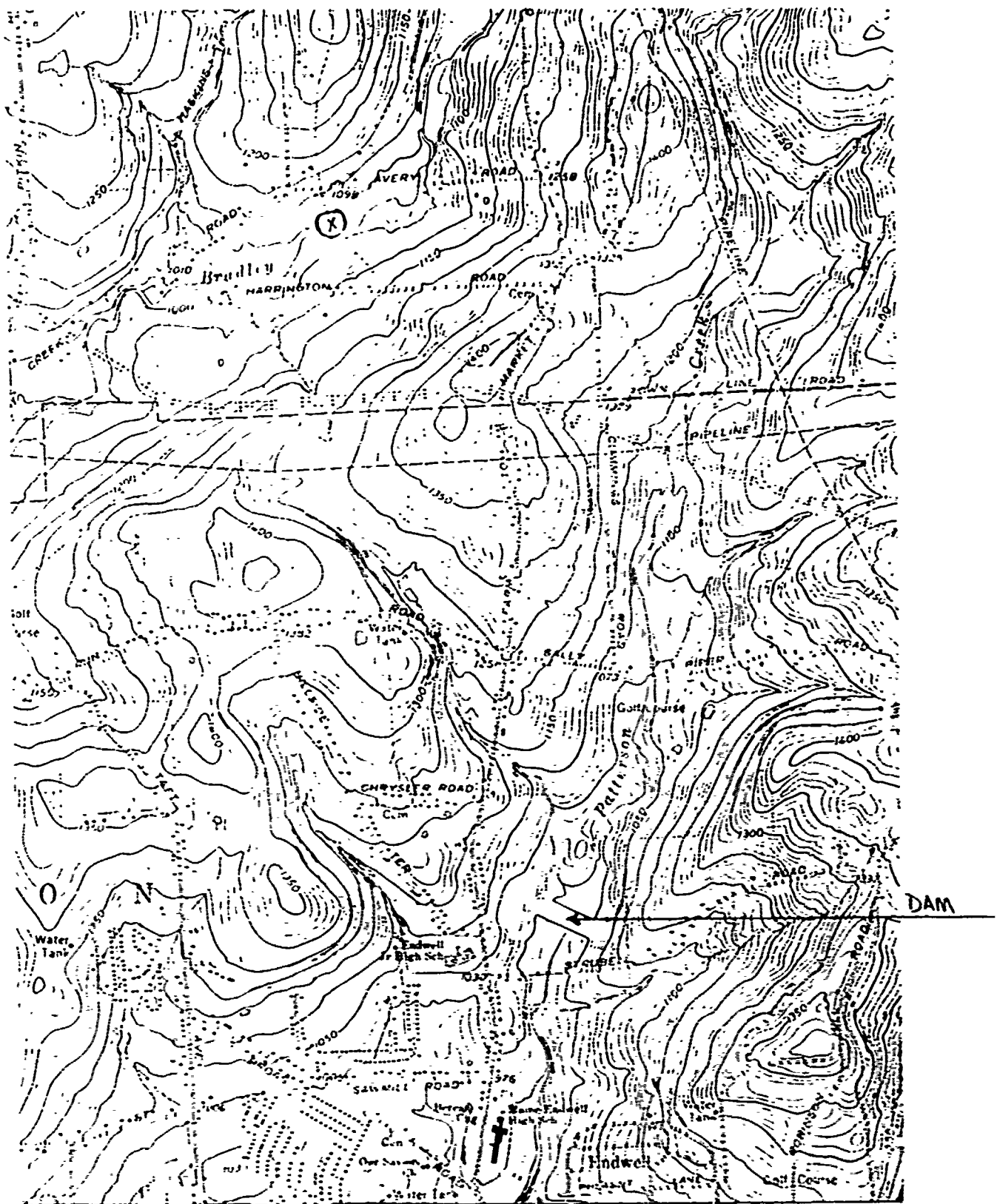


APPENDIX F

DRAWINGS



VICINITY MAP



TOPOGRAPHIC MAP

PATTERSON BRIXIUS & GREY CREEK WATERSHED PROJECT FLOODWATER RETARDING DAM NO. 1

DRAINAGE AREA	2829	ACRES
TOTAL STORAGE TO EMERGENCY SPILLWAY CREST	905	ACRE FT.
WATER SURFACE AREA AT SEDIMENT POOL	7.6	ACRES
HEIGHT OF DAM	65	FEET
VOLUME OF FILL	323,500	CUBIC YARDS

BUILT UNDER THE WATERSHED PROTECTION AND
FLOOD PREVENTION ACT

BY

COUNTY OF BROOME
WITH THE ASSISTANCE OF THE
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1965

INDEX

SHEET 1 - COVER SHEET	SHEET 9 - RISER - STRUCTURAL DETAILS
SHEET 2 - PLAN OF STORAGE AREA	SHEET 10 - RISER - REINF STEEL DETAILS
SHEET 3 - PLAN OF DAMSITE	SHEET 11 - CRADLE, ANTI-SEEP COLLARS AND STE
SHEET 4 - PROFILE ALONG E. OF DAM	SHEET 12 - POND DRAIN INLET DETAILS
SHEET 5 - PROFILES	SHEET 13 - IMPACT BASIN
SHEET 6 - DRAINAGE DETAILS	SHEET 14 - TRASH RACKS, AND MISC. DETAILS
SHEET 7 - DRAINAGE DETAILS	SHEET 15 - LOGS OF TEST HOLES
SHEET 8 - PLAN - PROFILE OF PRINCIPAL SPILLWAY	SHEET 16 - LOGS OF TEST HOLES

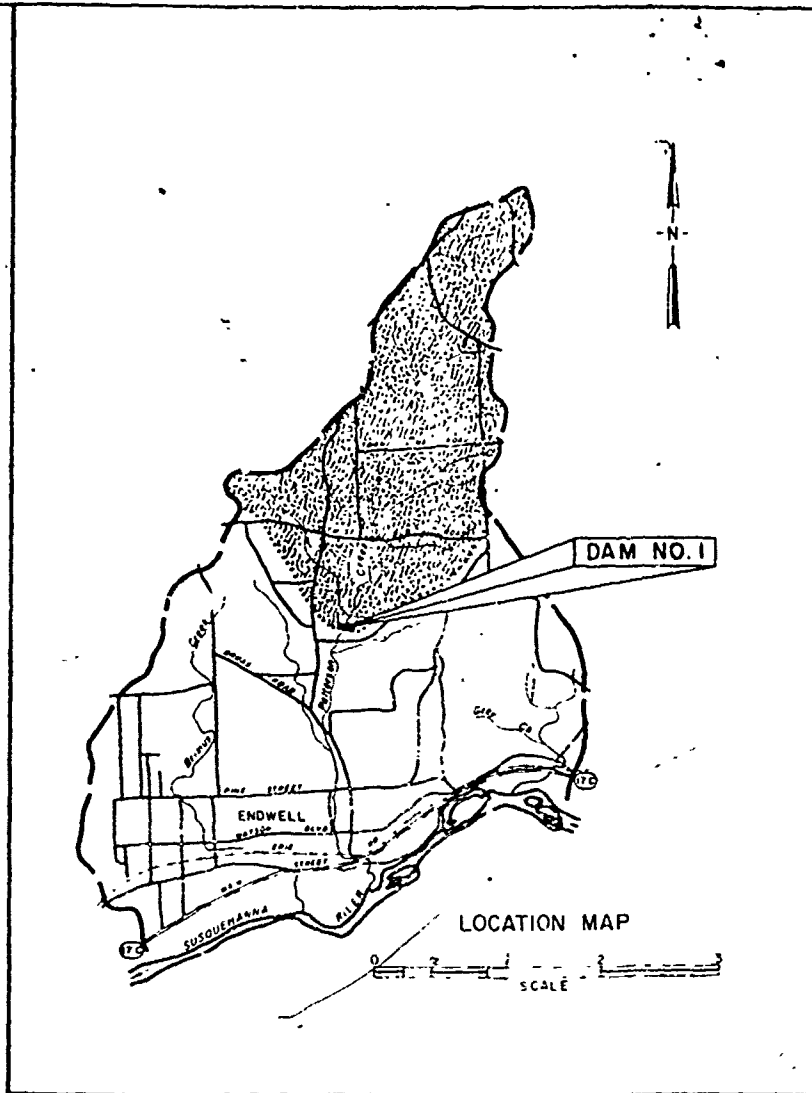
GREY CREEK PROJECT DAM NO. 1

2829 ACRES
905 ACRE FT.
7.6 ACRES
65 FEET
3,500 CUBIC YARDS

PROTECTION AND
ACT

TIME
OF THE
SERVICE

CULTURE



- 9 - RISER - STRUCTURAL DETAILS
- 10 - RISER - REINF. STEEL DETAILS
- 11 - CRADLE, ANTI-SEEP COLLARS AND STEEL DETAILS
- 12 - POND DRAIN INLET DETAILS
- 13 - IMPACT BASIN
- 14 - TRASH RACKS, AND MISC DETAILS
- 15 - LOGS OF TEST HOLES
- 16 - LOGS OF TEST HOLES

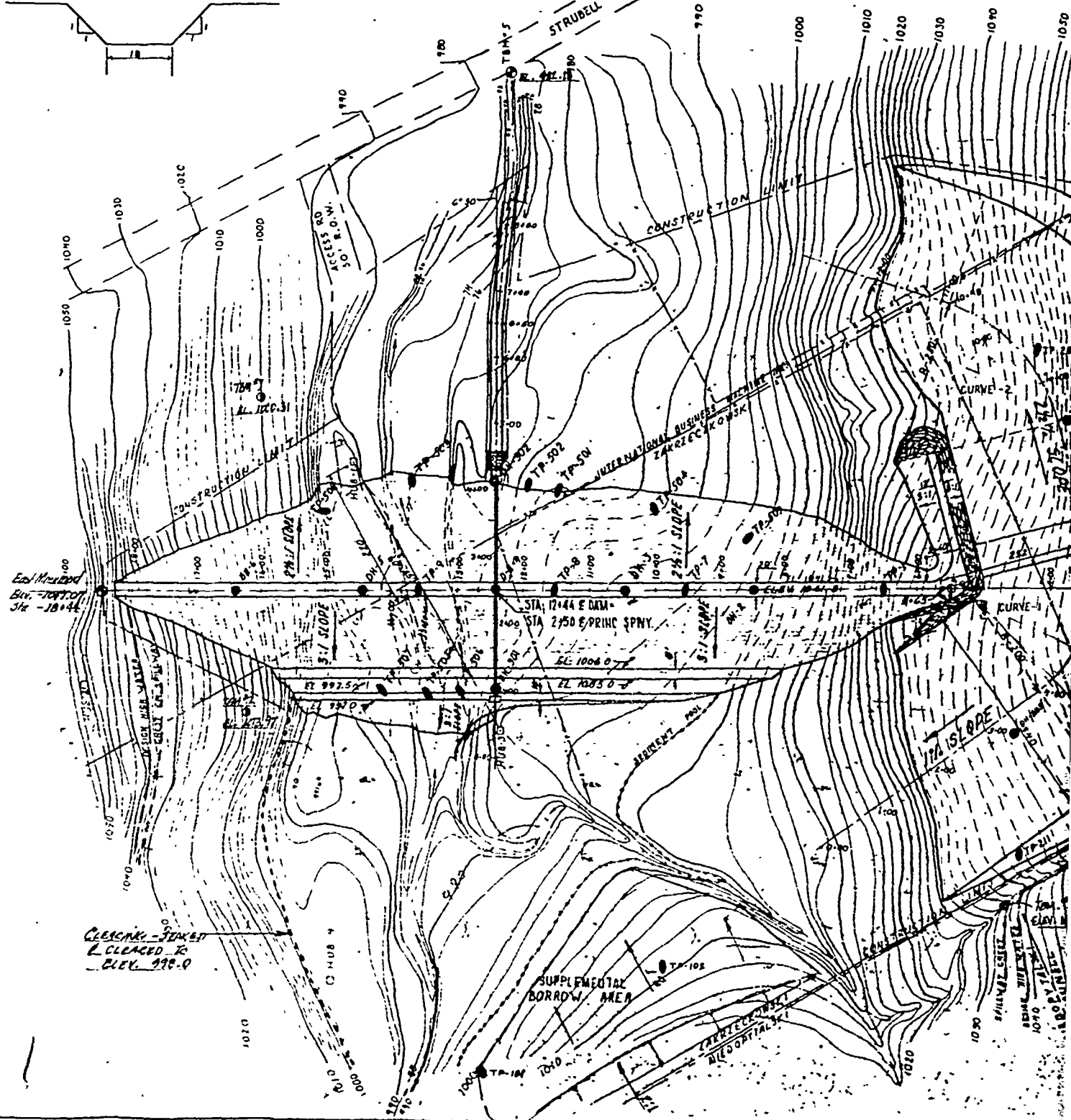
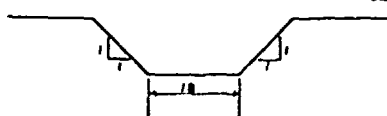
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK WATERSHED PROJECT FLOODWATER RETARDING DAM NO. 1 ENDWELL BROOME CO., NEW YORK COVER SHEET	
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Drawn by <i>Ben Lerman</i> Checked by M. NIKOLICH Engineer <i>Tom Beck</i>	Date 6-23 Project 10-2 NY-2013-P

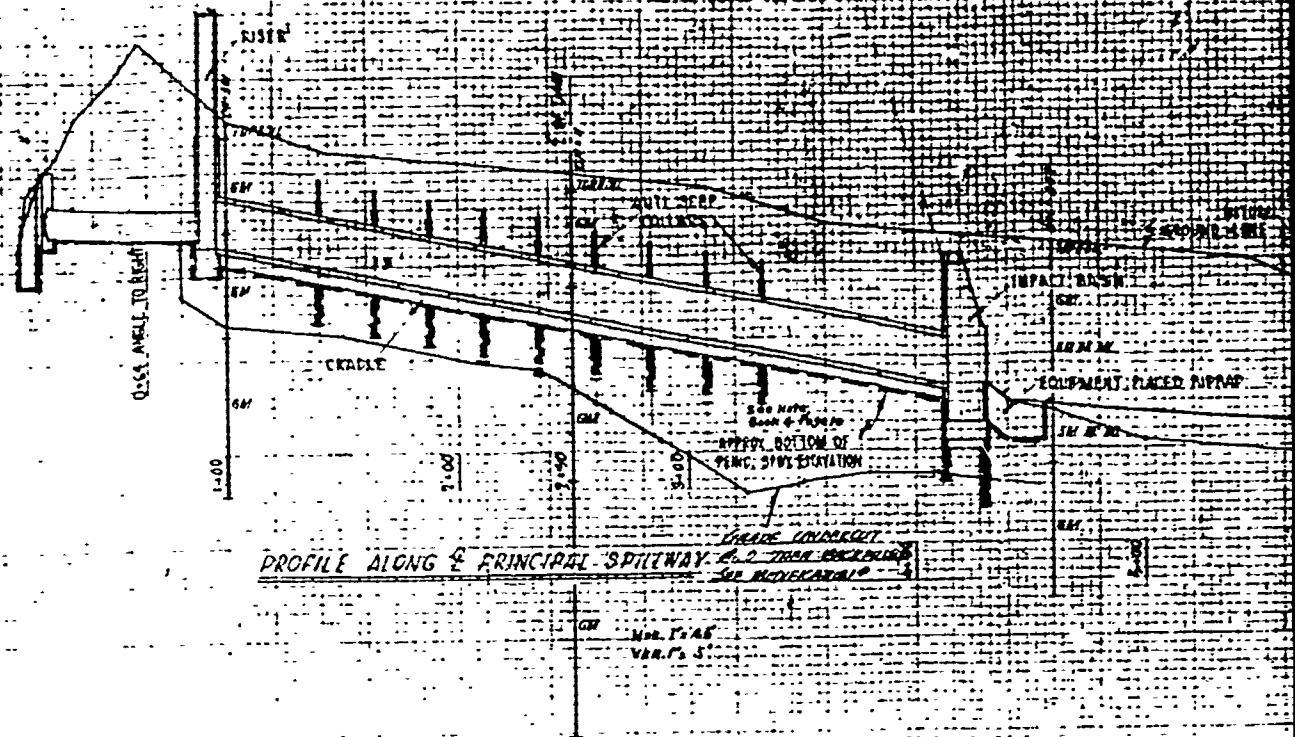
LEGEND

- SURVEY HUB
- ROAD
- STREAM
- CONTOUR
- FENCE EXISTING
- SEDIMENT POOL SURFACE
- CREST OF EMERGENCY SPILLWAY SURFACE
- DESIGN HIGH WATER SURFACE
- CONSTRUCTION LIMIT
- PROPERTY LINE

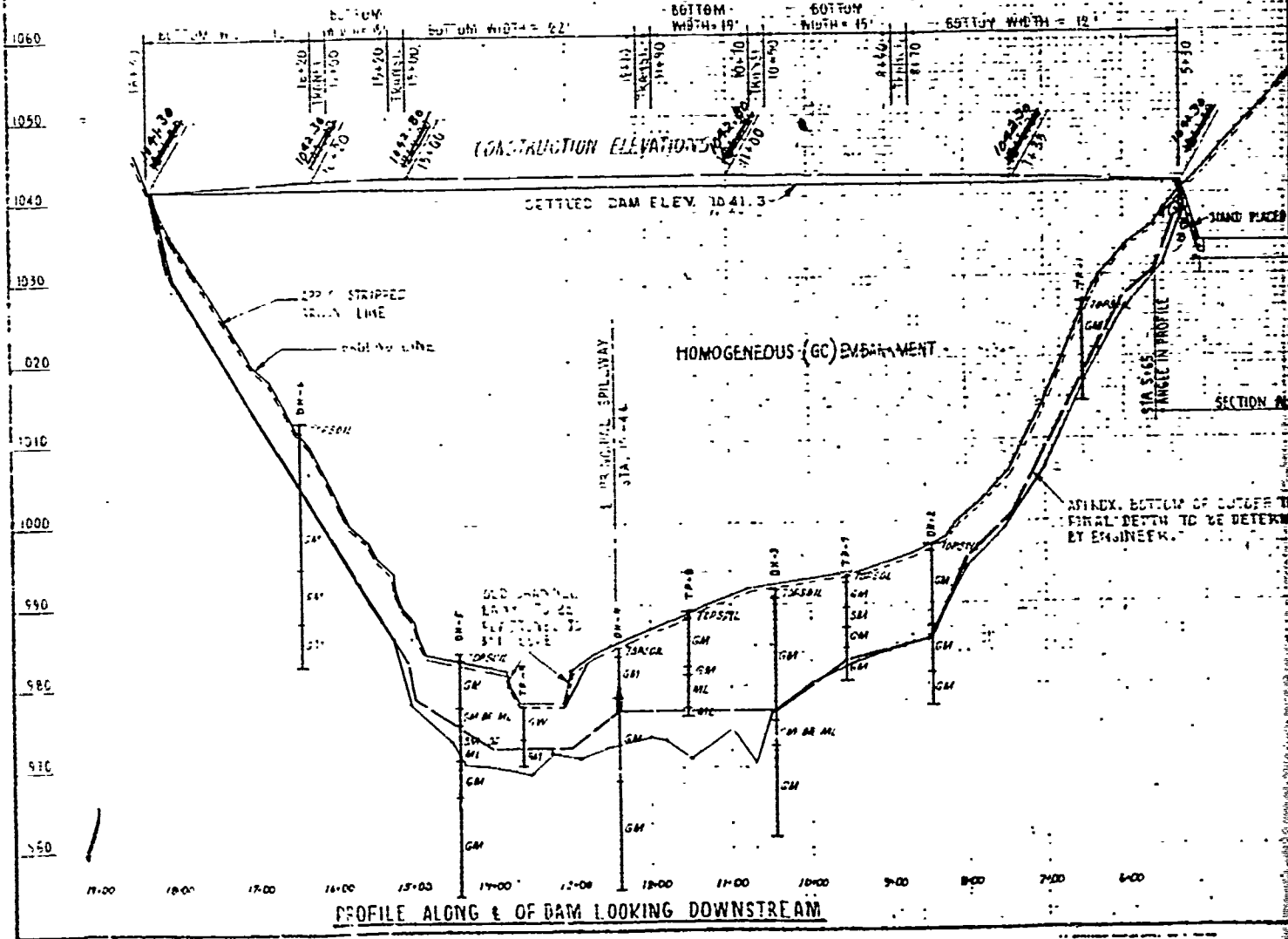
TYPICAL CROSS SECTION OF EXIT CHANNEL



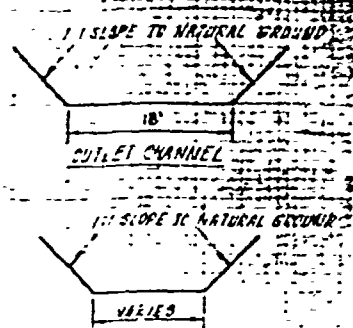
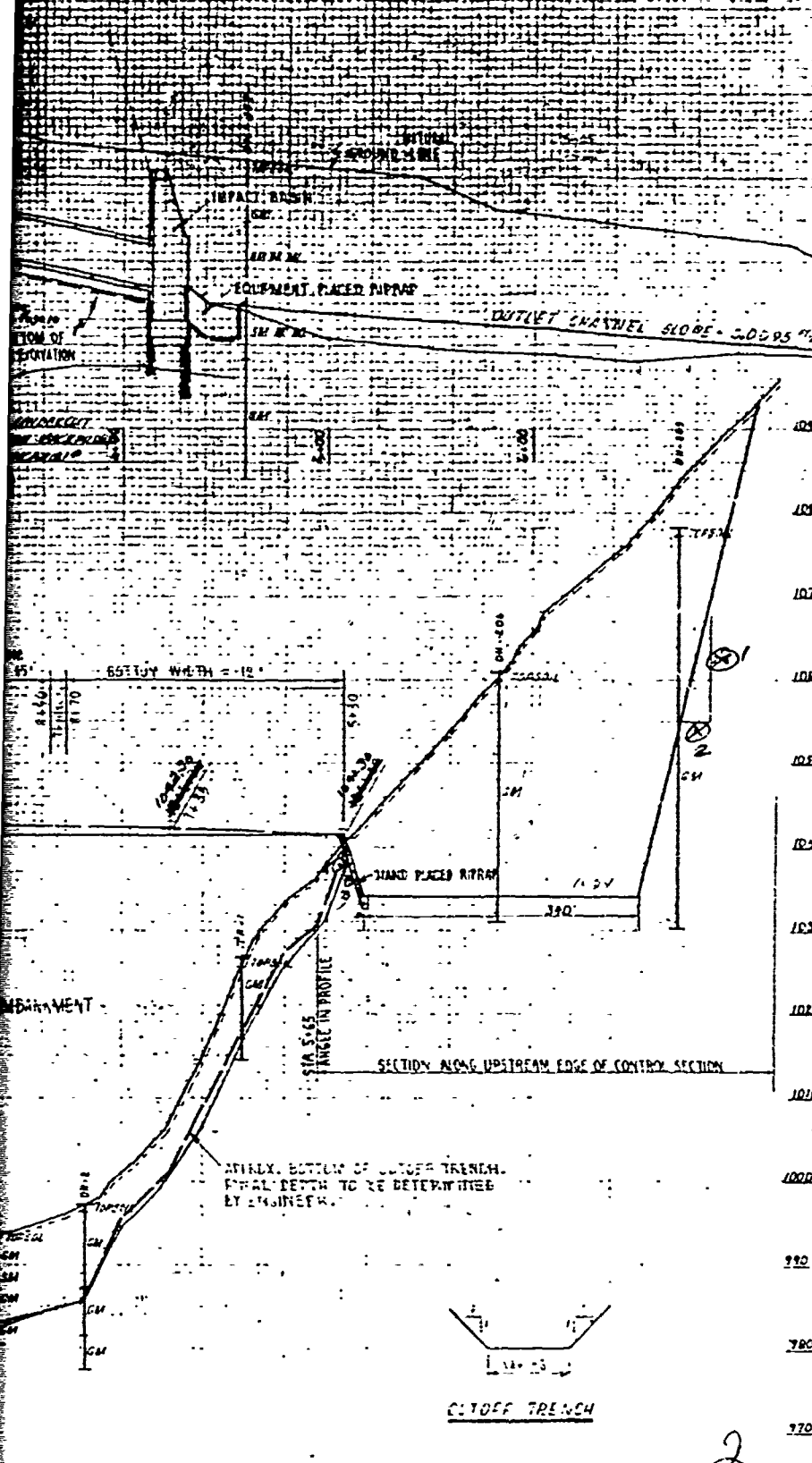
997
990
988
986
984
982
980
978
976
974
972



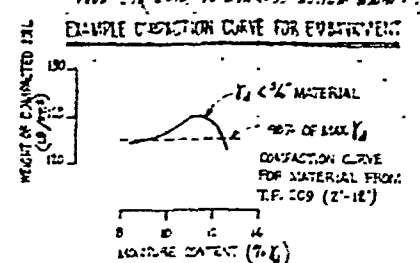
PROFILE ALONG & PRINCIPAL SPILLWAY



PROFILE ALONG & OF DAM LOOKING DOWNSTREAM



1:1 SLOPE TO NATURAL GROUND
18" BOTTOM WIDTH
OUTLET CHANNEL
1:1 SLOPE TO NATURAL GROUND
18" BOTTOM WIDTH
TYPICAL EXCAVATION SECTIONS
FROM POND INLET STRUCTURE TO STA 0+85
FROM STA 0+85 TO STA 0+100 BOTTOM WIDTH = 12"
FROM STA 0+100 TO STA 0+115 BOTTOM WIDTH = 12"
FROM STA 0+115 TO STA 0+130 BOTTOM WIDTH = 12"



- NOTE:
1. ALL EXCAVATIONS SHALL BE UNDER THE SUPERVISION OF THE DISTRICT ENGINEER TO BE MADE TO THE LINE AND DEPTH SHOWN ON THE DRAWING.
 2. THE EXCAVATION SHALL BE MADE TO THE DEPTH SHOWN ON THE DRAWING.
 3. THE EXCAVATION SHALL BE MADE TO THE DEPTH SHOWN ON THE DRAWING.
 4. THE EXCAVATION SHALL BE MADE TO THE DEPTH SHOWN ON THE DRAWING.

ESTIMATED QUANTITIES

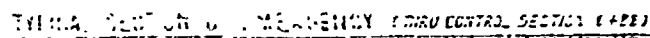
ITEM	QUANTITY	UNIT	PRICE	TOTAL
Excavation	1.00	cu yd	1.00	1.00
Backfill	1.00	cu yd	1.00	1.00
Gravel	1.00	cu yd	1.00	1.00
Sand	1.00	cu yd	1.00	1.00
Concrete	1.00	cu yd	1.00	1.00
Reinforcing Steel	1.00	lb	1.00	1.00
Formwork	1.00	sq ft	1.00	1.00
Other	1.00	sq ft	1.00	1.00
Total				1.00

AS BUILT

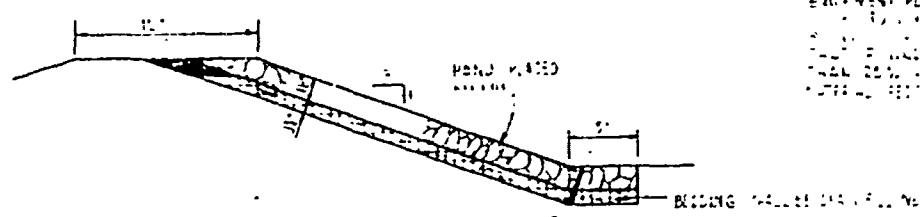
PATTERSON, BRIXUS, GREY CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 1
ENDWELL, BROOME CO., NEW YORK
PROFILE ALONG C OF DAM

**U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Drawn by	JH HARRINGTON	Date	1/65
Checked by	JL HUER	Date	1/65
Project No.	NY-2013-P		



EXISTING GROUND

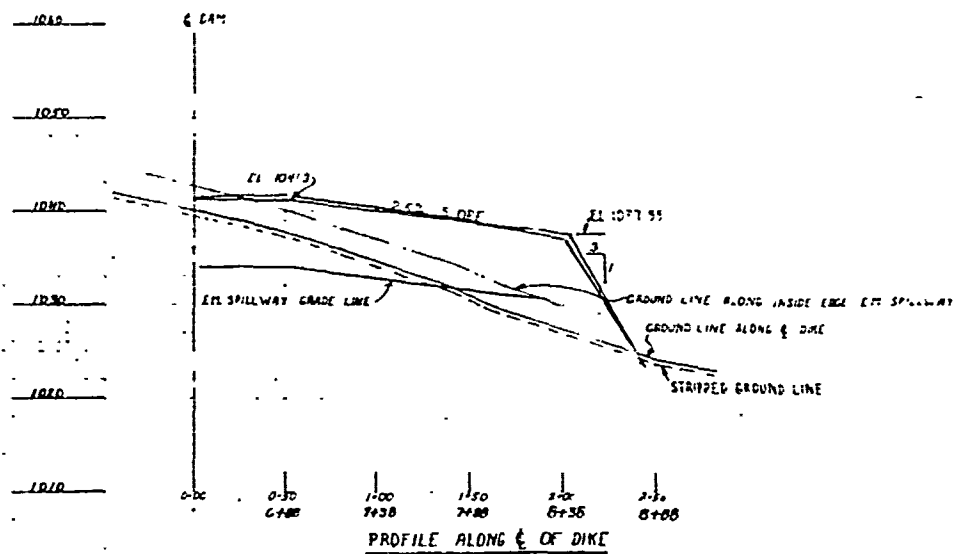
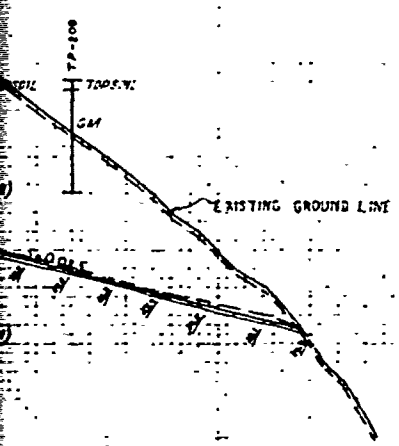


DATE
 DRAWN BY
 CHECKED BY
 APPROVED BY
 TITLE
 SHEET NO. 1 OF 1

4-4-65

6.1 (4-25)

0.11



AS BUILT

**PATTERSON, BRIXIUS, GREY CREEK
 WATERSHED PROJECT
 FLOODWATER RETARDING DAM NO. 1
 ENDWELL, BROOME CO., NEW YORK
 PROFILES**

**U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE**

Engineer	J. L. HARRINGTON	Date	1/65
Drawn	J. L. HUER	Date	1/65
Checked		Date	
Approved		Date	

NY-013-P

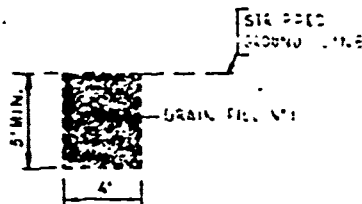
2

44 22

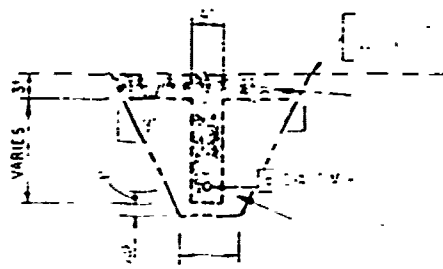
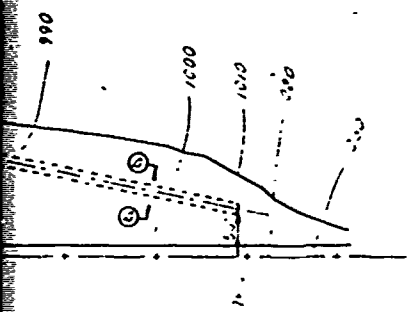
FOR 2014 - 15 SUMMARY

261 8-227 7.

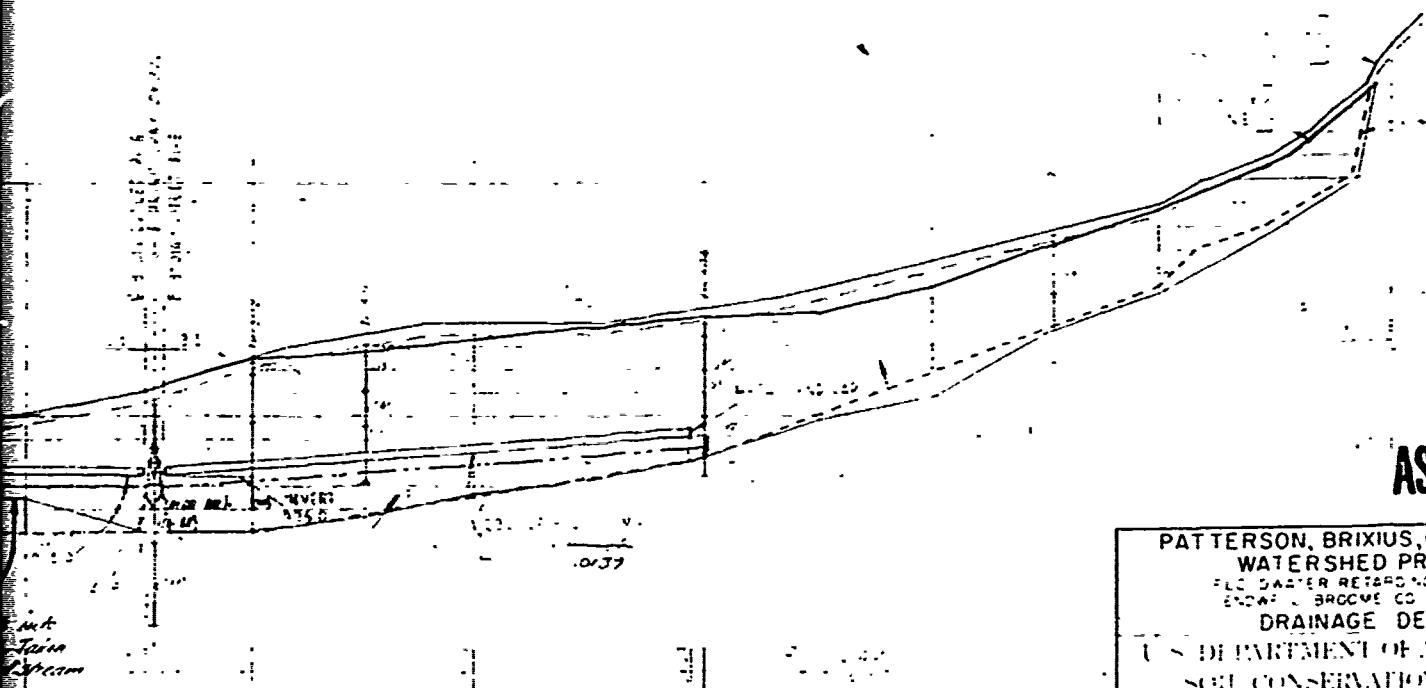




SECTION AA
 STA 7+00 TO STA 12+00
 STA 15+00 TO STA 16+50

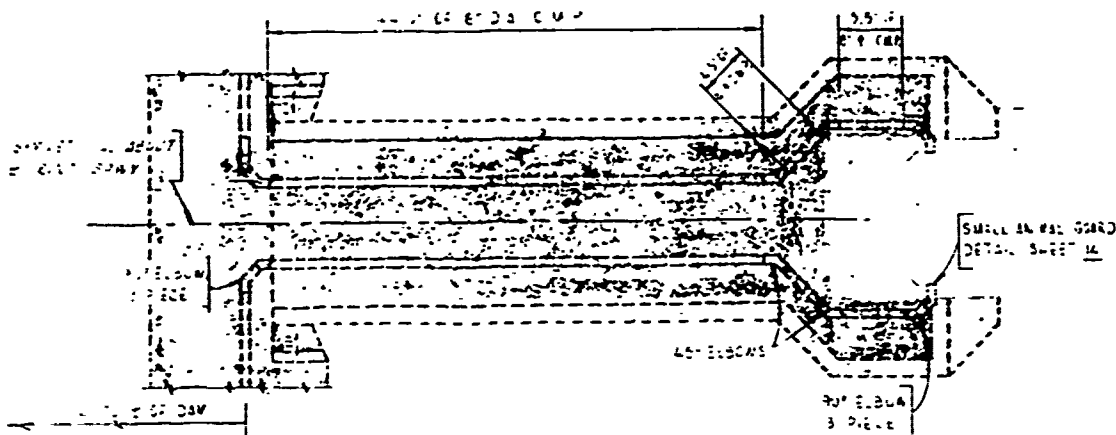


SECTION BB

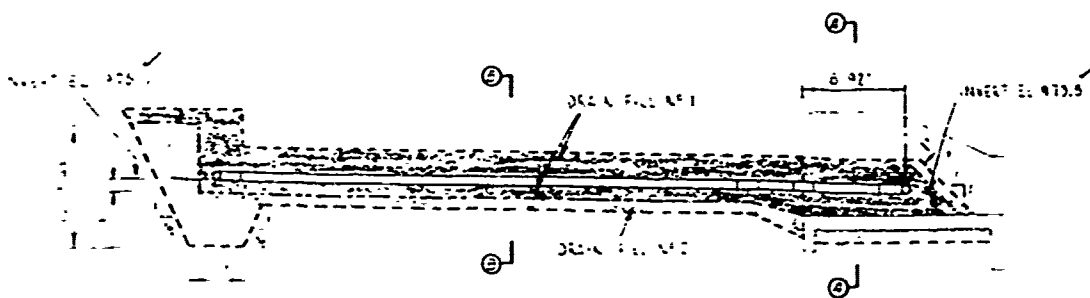


AS BUILT

PATTERSON, BRIXIOUS, GREY CREEK
 WATERSHED PROJECT
 FLD WATER RETARDING DIVISION
 ENDORSE BROOME COUNTY, NY
 DRAINAGE DETAILS
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE



PLAN OF OUTLET DRAIN



TYPICAL SECTION ALONG OUTLET DRAIN PIPE

OUTLET DRAIN DETAILS

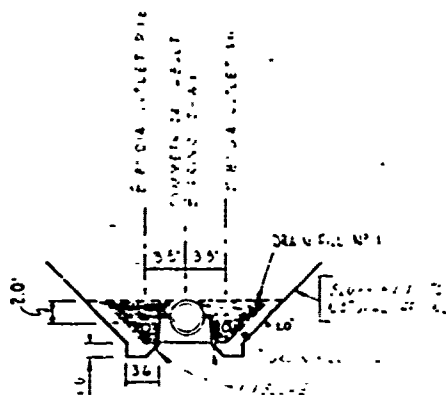
NOT TO SCALE

NOTE: ALL DRAIN PIPE SHALL BE 12" DIA. UNLESS OTHERWISE SPECIFIED. ALL JOINTS SHALL BE MADE WITH TYPE A, HOT APPLIED RUBBER. SEE SHEET 14 FOR DETAILS.

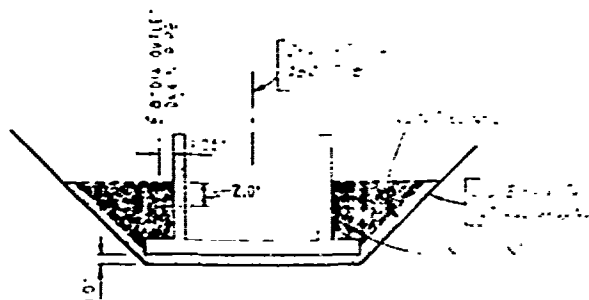
REVISION SUMMARY
 1. 11/78 12" DIA. DRAIN PIPE
 2. 11/82 12" DIA. DRAIN PIPE
 3. 11/82 12" DIA. DRAIN PIPE
 4. 11/82 12" DIA. DRAIN PIPE
 5. 11/82 12" DIA. DRAIN PIPE
 6. 11/82 12" DIA. DRAIN PIPE
 7. 11/82 12" DIA. DRAIN PIPE
 8. 11/82 12" DIA. DRAIN PIPE
 9. 11/82 12" DIA. DRAIN PIPE
 10. 11/82 12" DIA. DRAIN PIPE

DESIGN DATA		PIPER	
NO.	DATE	NO.	DATE
1	11/78	1	11/78
2	11/82	2	11/82
3	11/82	3	11/82
4	11/82	4	11/82
5	11/82	5	11/82
6	11/82	6	11/82
7	11/82	7	11/82
8	11/82	8	11/82
9	11/82	9	11/82
10	11/82	10	11/82

SMALL 4x4 W/SL GARD
DETAIL SEE 14



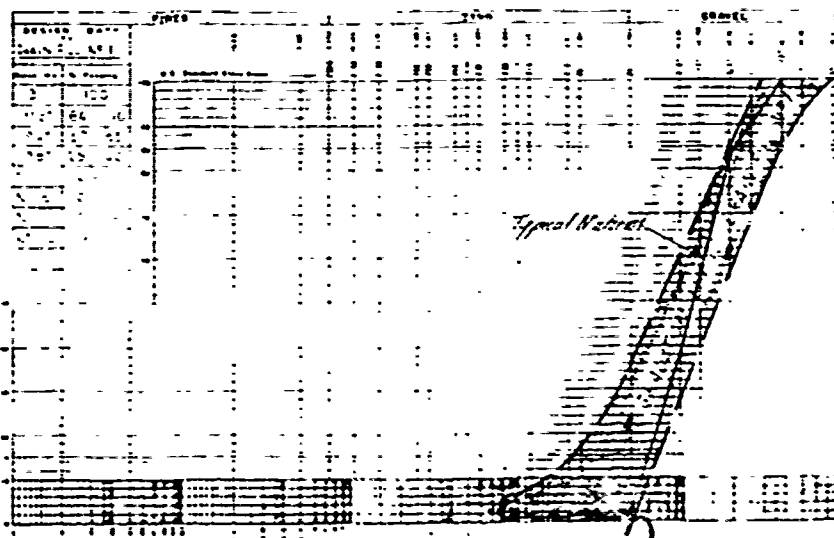
SECTION BB



SECTION CC

DETAILS

GRAIN SIZE DISTRIBUTION GRAPH

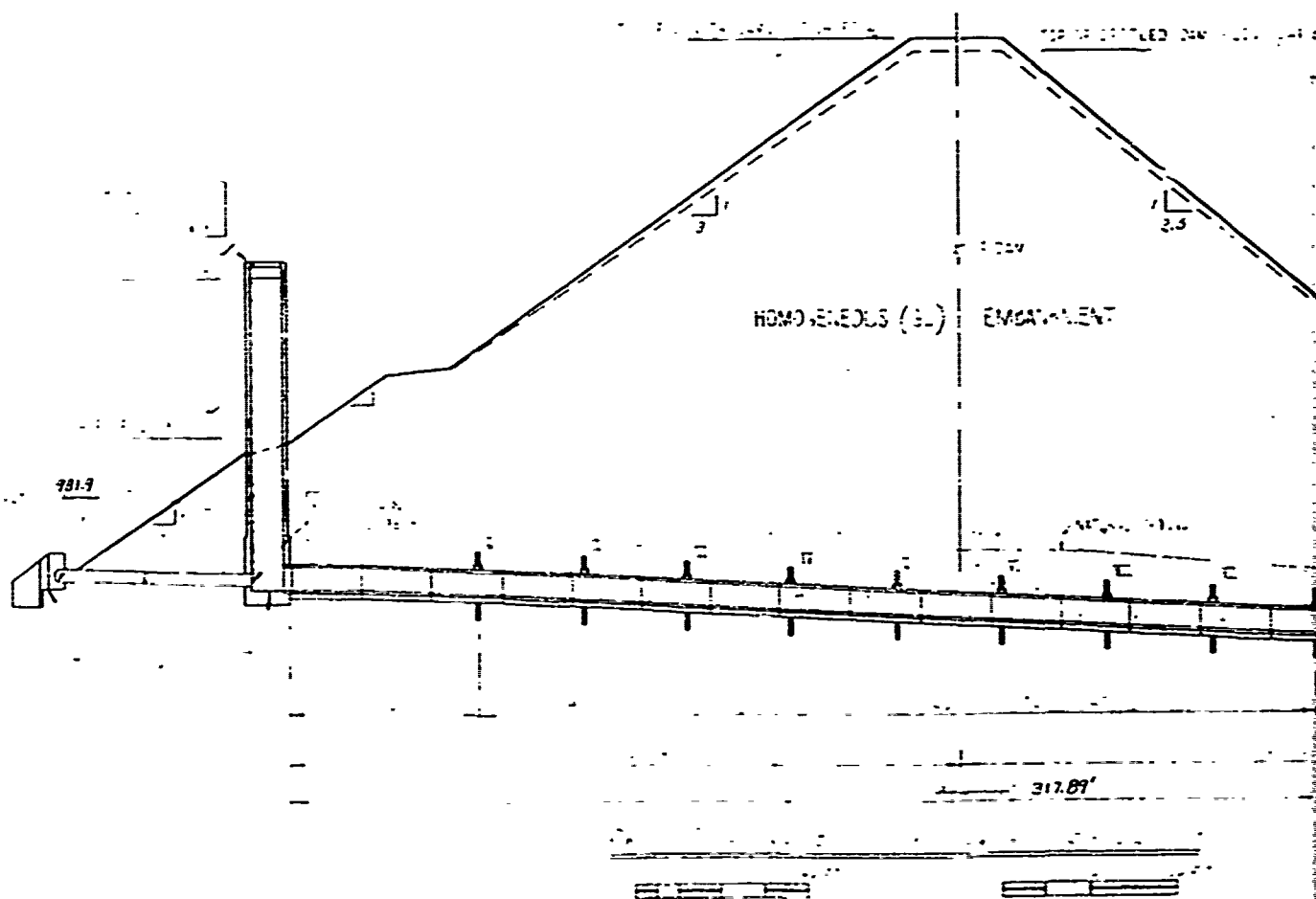


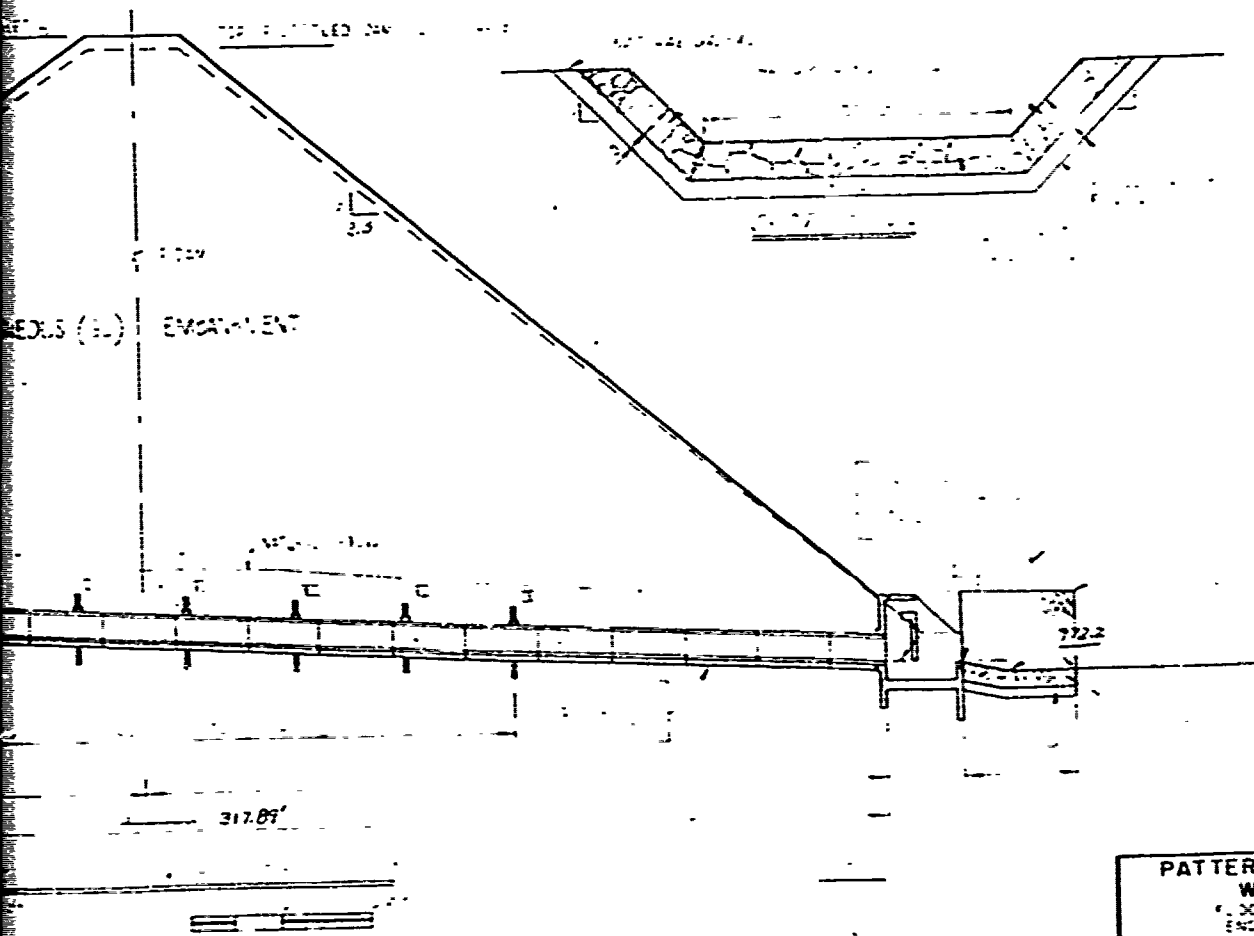
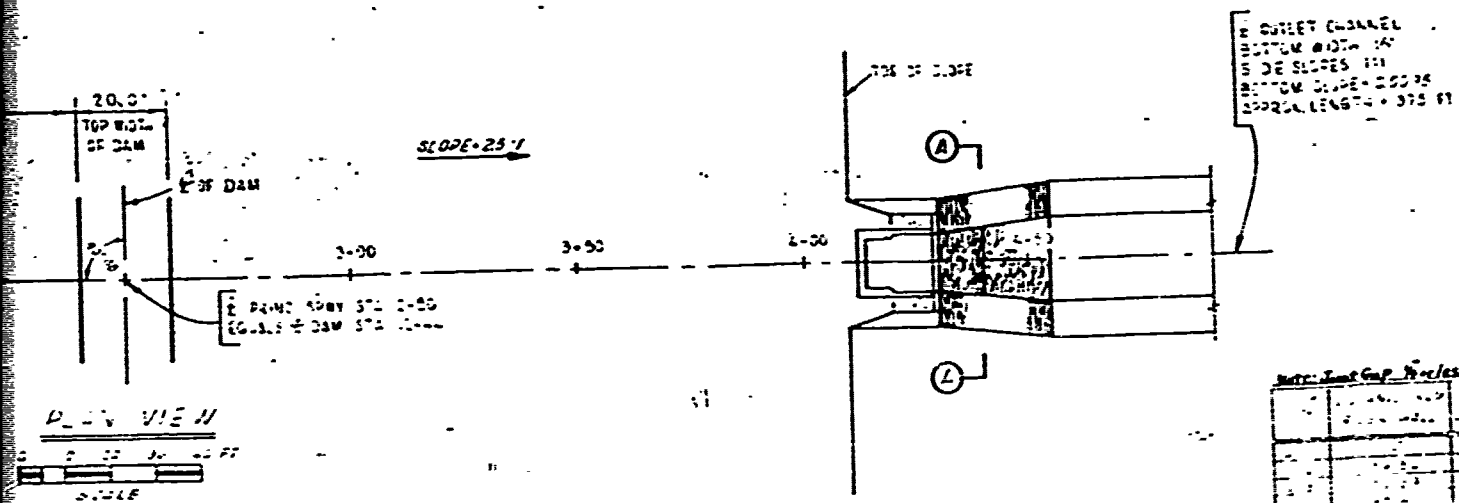
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 1
ENDRELL BROOME CO., NEW YORK
DRAINAGE DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Drawn by	Scale	Approved by
Drawn	1/2" = 1'	Drawn
Checked	1/4" = 1'	Checked
NY-2013-P		





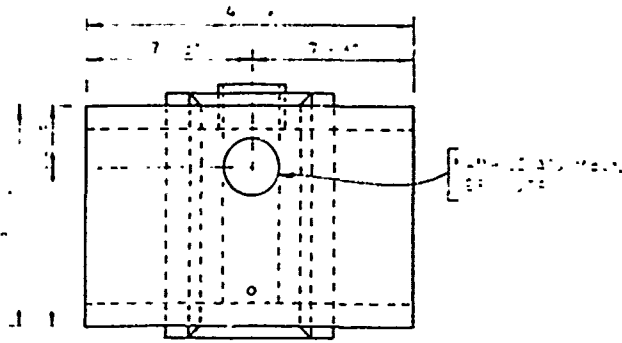
NOTE: See Map for location of dam.

Station	Top of Dam	Bottom of Dam	Outlet Channel
0+00	772.2	772.2	772.2
0+50	772.2	772.2	772.2
1+00	772.2	772.2	772.2
1+50	772.2	772.2	772.2
2+00	772.2	772.2	772.2
2+50	772.2	772.2	772.2
3+00	772.2	772.2	772.2
3+50	772.2	772.2	772.2
4+00	772.2	772.2	772.2
4+50	772.2	772.2	772.2
5+00	772.2	772.2	772.2
5+50	772.2	772.2	772.2
6+00	772.2	772.2	772.2
6+50	772.2	772.2	772.2
7+00	772.2	772.2	772.2
7+50	772.2	772.2	772.2
8+00	772.2	772.2	772.2
8+50	772.2	772.2	772.2
9+00	772.2	772.2	772.2
9+50	772.2	772.2	772.2
10+00	772.2	772.2	772.2

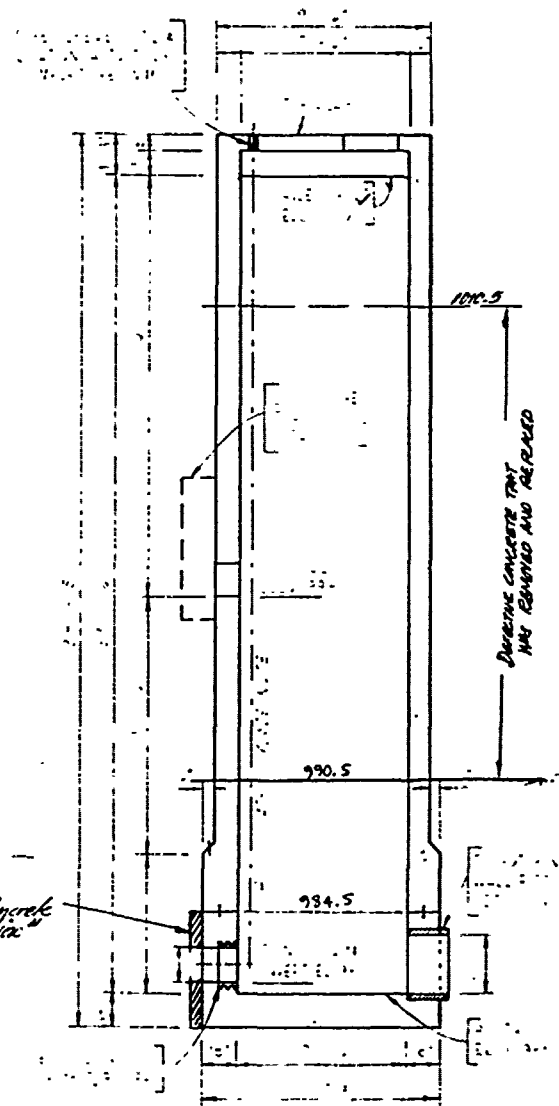
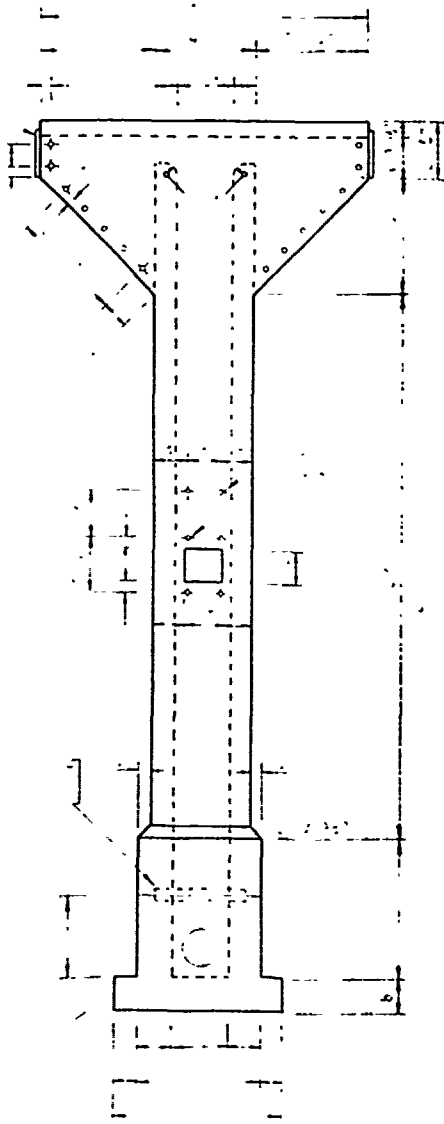
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
F. JOSEPH R. BIRDSONG DAM NO. 1
ENCLAVE BROOME CO. NEW YORK
PLAN - PROFILE OF PRINCIPAL SPILLWAY
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2013-P



SEE PLAN



SECTION 10' 6" HIGH

SLIDE GATE NOTES

- 1 18" DIA SLIDE GATE
- 2 PLAT FRAME
- 3 E TYPE APPL 74 HOLE 9" DIA
- 4 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 5 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 6 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 7 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 8 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 9 STEV HOLE 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 10 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 11 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 12 1" DIA MIN ROUND HOLE LIFTING DEVICE
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- 96 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 97 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 98 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 99 1" DIA MIN ROUND HOLE LIFTING DEVICE
- 100 1" DIA MIN ROUND HOLE LIFTING DEVICE

MANHOLE ASSEMBLY NOTE

- 1 30 DIA MANHOLE COVER WITH UNDERSIDE HOOKS AND A 1" DIA MIN ROUND HOLE LIFTING DEVICE
 - 2 PAINT IN ACCORDANCE WITH CONST SPEC 22
- SUPPLIED: ROONEY HUNT MODEL 120

PLATE CONSTR JOINT

AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 1
ENDWELL BROOME CO, NEW YORK
RISER - STRUCTURAL DETAILS
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2013-P

2

NOTE: This hole sampled at 5' intervals w/dry
as used in surface hole.

TP 9, C/L, ELEV. 977.2

0 1 Topsoil

1 7 Gravel, well graded down to about 25% fines - (M) some 4"-6" subrounded cobbles - brown - moist to wet - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense. D.S. & Comp.

7 8 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - bluish gray - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

8 12 Silt, approx. 10% sand sizes - rock flour - (M) some weak bedding - brown - wet, w/minor seepage - slowly permeable - Binghamton lacustrine - stiff. D.S. 8.1

12 13 Silt, approx. 10% sand sizes - rock flour - (M) some weak bedding - blue-gray - wet, w/minor seepage - slowly permeable - Binghamton lacustrine - stiff. D.S. 8.2

TP 9, C/L, ELEV. 977.8

0 4 Gravel, alluvial - clean - brown - saturated (M) below 2' w/heavy seepage - rapidly permeable - medium to dense.

4 7.5 Sand, medium to fine, quite silty - bluish gray - wet to saturated - slow to moderately permeable - Binghamton lacustrine - stiff.

NOTE: This pit dug under H₂O, therefore it was difficult to log accurately.

TP 101, Borrow, ELEV. 1001.0

0 1 Topsoil

1 11 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Below 6' in this test pit, there is a noticeable increase in 8"-10" flags.

TP 102, Borrow, ELEV. 1009.0

0 1 Topsoil

1 11 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Below 6' in this test pit, there is a noticeable increase in 8"-10" flags.

DM 201, Lmr. Spill., ELEV. 1057.9

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

15.0 Tube Spirl.
65 RB
66 RB
67 RB
68 RB
69 RB
70 RB
71 RB
72 RB
73 RB
74 RB
75 RB
76 RB
77 RB
NOTE: Driller indicated a siltier material from 27'-32'. He had poor recovery but when I checked the samples I did notice this - it is possible that there is a silt some here.

DM 202, Lmr. Spill., ELEV. 1075.1

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

15.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - grayish brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

30.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

45.0 NOTE: This hole sampled at 3' intervals w/dry tube spirl. and 48 used to analyze hole.

DM 203, Lmr. Spill., ELEV. 1078.2

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Driller interpreted a zone of "silty till w/this silt lenses" from 10'-20'. I could not pick this up clearly from the samples.

DM 204, Lmr. Spill., ELEV. 1054.5

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till. Driller noted some thin lenses of medium gravel in the 24'-25' zone.

DM 205, Lmr. Spill., ELEV. 1047.5

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Color change to a grayish brown at about 15'.

DM 206, Lmr. Spill., ELEV. 1060.9

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Driller logged a zone of "higher boulder content" from 15.5 to 25.5.

DM 207, Lmr. Spill., ELEV. 1048.1

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - grayish brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

25.5 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

TP 208, Lmr. Spill., ELEV. 1048.2

0 1 Topsoil

1 12 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till. D.S. 20.1

TP 209, Lmr. Spill., ELEV. 1048.0

0 1 Topsoil

1 12 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till. D.S. 20.1

TP 210, Lmr. Spill., ELEV. 1044.0

0 1 Topsoil

1 12 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till. D.S. 20.1

TP 211, Lmr. Spill., ELEV. 1042.0

0 1 Topsoil

1 12 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

DM 301, Frin. Spill., ELEV. 987.8

H =

0.0 Topsoil
1.0 Gravel, quite silty w/some sands - numerous (M) +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

6.0 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - grayish brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

11.5 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - gray - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Several layers of pure brown sand noted in the 12'-15' zone.

DM 302, Frin. Spill., ELEV. 981.0

H =

0.0 Topsoil
1.0 Gravel, well graded down to about 25% fines - some 4"-6" subrounded cobbles - brown - moist to wet - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense.

3.7 Silt, occasional pebbles & fine gravels - (M) some weak bedding - gray - wet - very - slowly permeable - glacio-lacustrine, Binghamton drift - very stiff.

9.0 Sand, possibly 45% silt fraction - very fine - some weak bedding noted - brown - or saturated - slowly permeable - probably M. Wisconsin lacustrine associated with Binghamton drift - hard. Noted "some water bearing gravel streaks" - brown - saturated.

11.9 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - sub-angular to subrounded - grayish brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

AS BUILT

(XX) FIELD CLASSIFICATION BY VISUAL INSPECTION
AA UNIFIED SOIL CLASSIFICATION BY THE LABORATORY

PATTERSON, BRIKUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 1
ENDWELL BROOME CO. NEW YORK
LOGS OF TEST HOLES

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2013-P

TP 501, U.S. Toe, ELEV. 984.1

- 0 1 Topsoil
- 1 4 Gravel, well graded down to about 25% fines - (OH)
fines - use 4"-6" subrounded cobbles - brown - moist to wet - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense.
- 4 7 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - subangular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.
- 7 12 Silt, approx. 10% sand sizes - rock flour - (ML)
some weak bedding - brown - wet, w/minor seepage - slowly permeable - Binghamton lacustrine - stiff.

TP 502, D.S. Toe, ELEV. 984.5

- 0 1 Topsoil
- 1 5 Gravel, well graded down to about 25% fines - (OH)
some 4"-6" subrounded cobbles - brown - moist to wet - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense.
- 5 9 Silt, approx. 10% sand sizes - rock flour - (ML)
some weak bedding - brown - wet, w/minor seepage - slowly permeable - Binghamton lacustrine - stiff.
- 9 12.5 Silt, approx. 10% sand sizes - rock flour - (ML)
some weak bedding - blue gray - wet, w/minor seepage - slowly permeable - Binghamton lacustrine - stiff.

TP 503, D.S. Toe, ELEV. 976.0

- 0 3 Gravel, alluvial - clean - brown - saturated (Oh)
below 2' with heavy seepage - rapidly permeable - medium to dense - Recent.
- 3 6 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - subangular to subrounded - blue gray - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

NOTE: Moderately dense from 3'-6" and very dense below 6".

TP 504, D.S. Toe, ELEV. 987.8

- 0 1 Topsoil
- 1 4 Gravel, well graded down to about 25% fines - (OH)
some 4"-6" subrounded cobbles - brown - moist to wet - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense. D.S. 504 Comp.
- 4 8 Gravel, well graded down to about 25% fines - (OH)
some 4"-6" subrounded cobbles - brown - saturated - slow to moderate permeability - Wisconsin age, Binghamton drift (possibly some Recent mixed in) - dense.
- 8 10.5 Gravel, fine (pea gravel) - considerable (Oh)
sand - grayish brown - saturated - moderate to rapidly permeable - Wisconsin age, Binghamton drift - compact.
- 10 5 13.0 Sand, coarse w/some lenses of medium to fine (SP)
sand - somewhat runny w/fairly heavy seepage - brown - mod. dense - mod. permeable - saturated.

TP 505, U.S. Toe, ELEV. 981.5

- 0 3.5 Gravel, alluvial - clean - brown - saturated (Oh)
below 2' w/heavy seepage - rapidly permeable - loose - Recent.
- 3.5 11.0 Sand, medium to fine, quite silty - bluish (SH)
gray - wet to saturated - slow to moderately permeable - Binghamton lacustrine - stiff.

TP 506, U.S. Toe, ELEV. 979.3

- 0 4.5 Gravel, alluvial - clean - brown - saturated (Oh)
below 2' w/heavy seepage - rapidly permeable - loose - Recent.
- 4.5 11.0 Sand, coarse, quite silty - bluish gray - wet (SH)
to sat. - slow to moderately permeable - Binghamton lacustrine - stiff.

TP 507, U.S. Toe, ELEV. 985.2

- 0 3.5 Gravel, alluvial - clean - brown - saturated (Oh)
below 2' - rapidly permeable - 1 ss - Recent.
- 3.5 5.5 Sand, medium to fine, quite silty - brown - (SH)
wet to sat. - slow to moderately permeable - Binghamton lacustrine - stiff.
- 5.5 11.5 Sand, medium to fine, quite silty - bluish gray (SH)
wet to sat. - slow to moderately permeable - Binghamton lacustrine - stiff.

TP 508, D.S. Toe, ELEV. 983.0

- 0 1 Topsoil
- 1 4 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - subangular to subrounded - brown - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.
- 4 7 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - subangular to subrounded - blue gray - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.

TP 509, D.S. Toe, ELEV. 995.3

- 0 1 Topsoil
- 1 5 Gravel, quite silty w/some sands - numerous +6" cobbles & flags (approx. 15% +3") - subangular to subrounded - brown - some nodding to gray below 4' - moist to wet - slowly permeable - Wisconsin age, Binghamton drift - dense to very dense - glacial till.
- 5 11 Gravel, quite high in sands (sandy till) - (Oh)
brown - saturated (quite easy digging) - mod. permeable - fairly heavy seepage at 8' level (measured 7 g.p.m. flow into test pit) - Binghamton drift (possibly an outwash remnant).

LEGEND

Test Hole Numbering System

Centerline of dam	1 - 99
Borrow area	101 - 199
Emergency spillway	201 - 299
Centerline of outlet structure	301 - 399
Stream channel	401 - 499
Relief wells	501 - 599

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

OH	Silty gravels; gravel-sand-silt mixtures
ML	Silts; silty, v. fine sands; sandy or clayey silts
SH	Sand, silty
GW	Gravel, clean, well graded.

SAMPLE

DS Disturbed

KEY TO DRILL HOLE (OH) LOGS

N = 22	N - Number of blows required for 1 ft. standard penetration, using 2.0" O.D. split barrel sampler, 140 lb. hammer, and 30" drop. ASTM D 1586.
CL	9.0 Depth in hole (ft.) Unified Soil Classification Symbol
12.0	
RB	Roller bit to advance hole by wash boring
17.0	Depth in hole
KI	Rock core, 2-1/8" diameter
75%	
50%	Percent rock core recovery in each drill run
90%	
La	Bedrock symbol

*** FIELD CLASSIFICATION BY VISUAL INSPECTION

** UNIFIED SOIL CLASSIFICATION BY THE LABORATORY

